Fig. 1

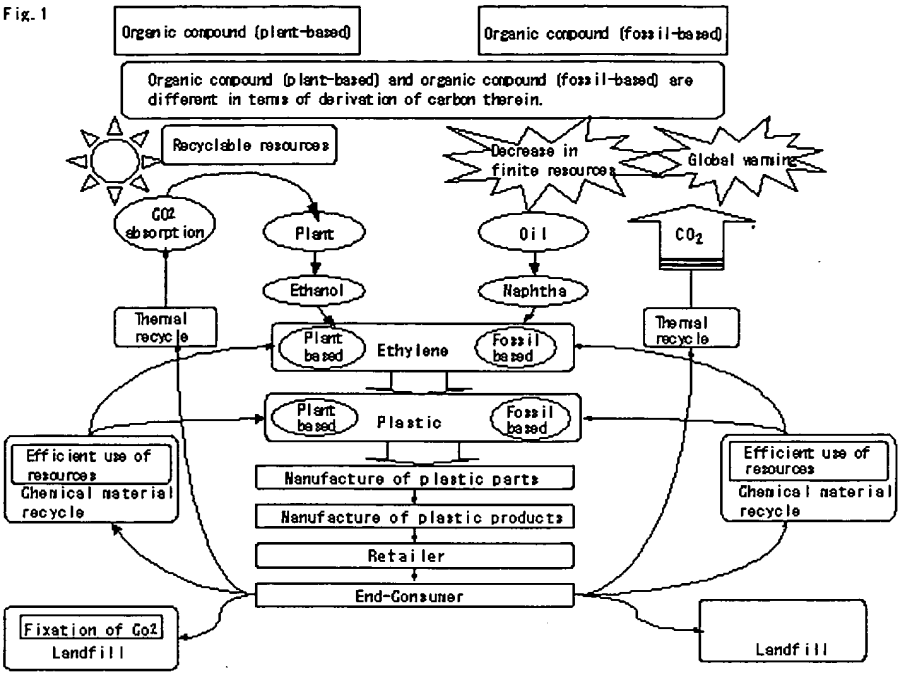


Fig. 2

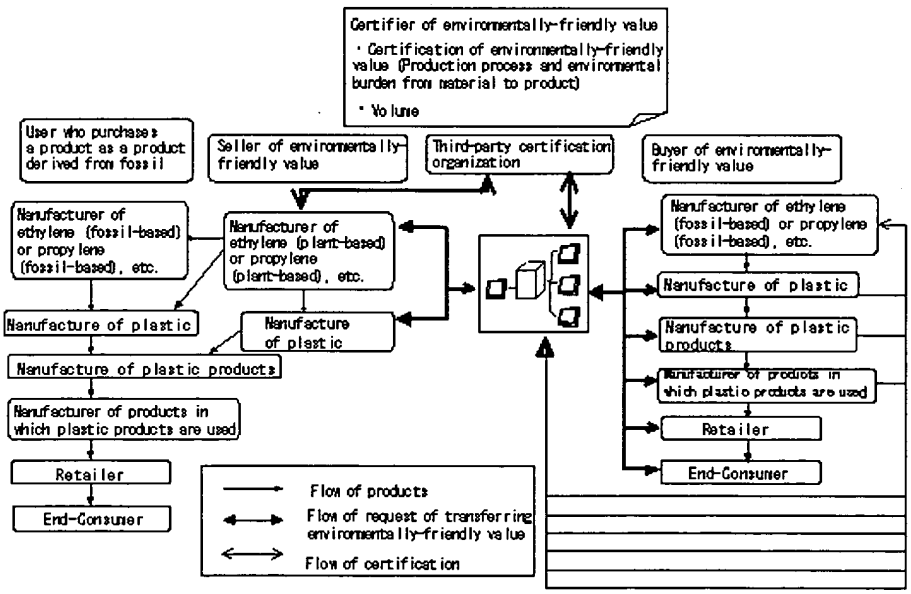


Fig.3

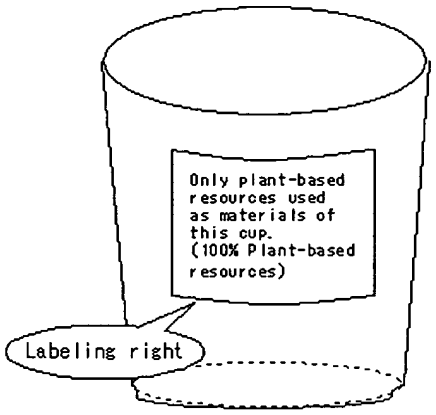

Only plant-based resources used as materials of this cup. (100% Plant-based resources)
Labeling right

Fig.4

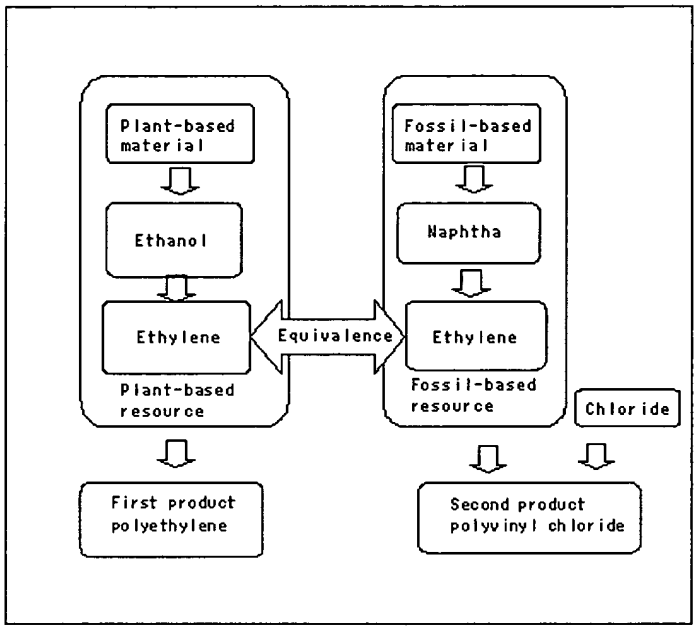

Plant-based material
Ethanol
Ethylene
Plant-based resource
Equivalence
Fossil-based material
Naphtha
Ethylene
Fossil-based resource
Chloride
First product polyethylene
Second product polyvinyl chloride

Fig.5

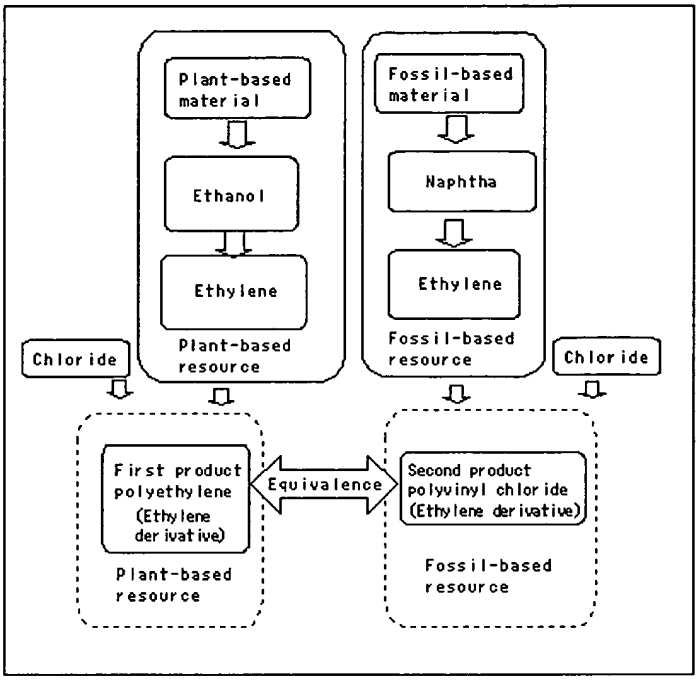

Plant-based material
Ethanol
Ethylene
Plant-based resource
Fossil-based material
Naphtha
Ethylene
Fossil-based resource
Chloride
Chloride
First product polyethylene (Ethylene derivative)
Plant-based resource
Equivalence
Second product polyvinyl chloride (Ethylene derivative)
Fossil-based resource

Fig.6

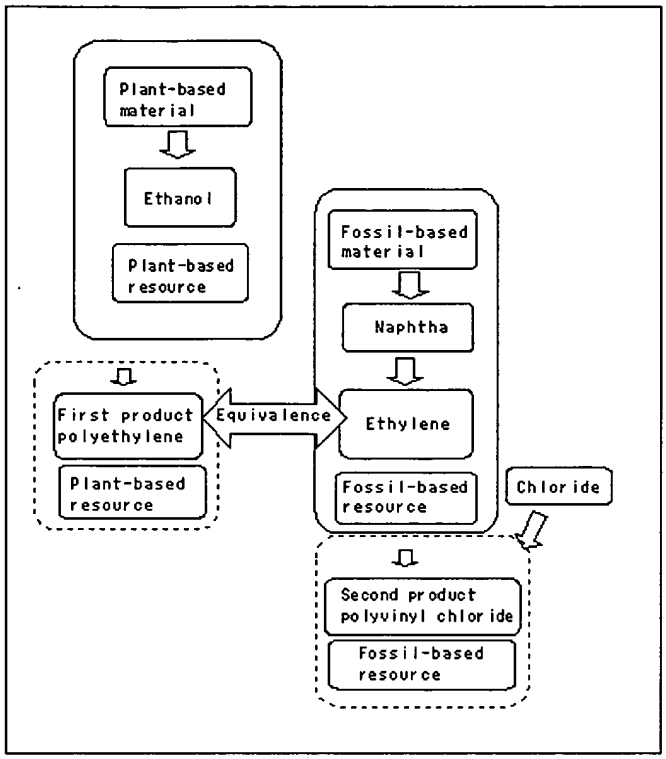

Plant-based material
Ethanol
Plant-based resource
Fossil-based material
Naphtha
Ethylene
Fossil-based resource
Chloride
Equivalence
First product polyethylene
Plant-based resource
Second product polyvinyl chloride
Fossil-based resource

Fig.7

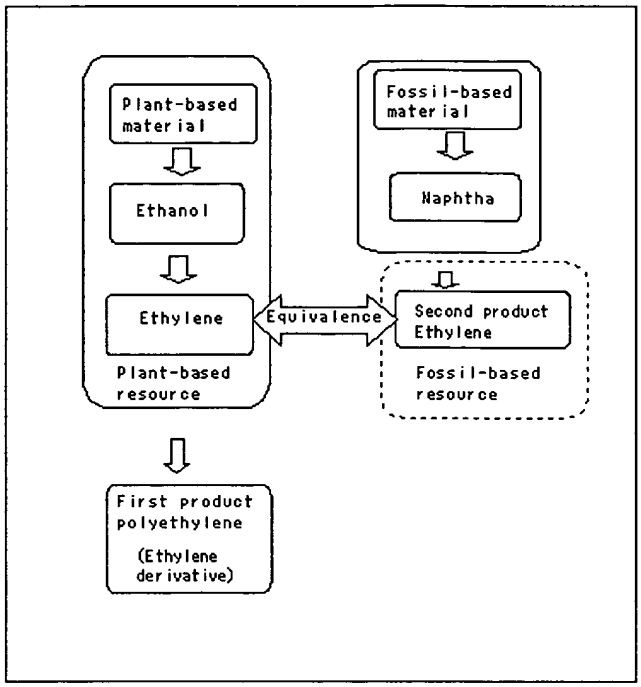

Plant-based material
Ethanol
Ethylene
Plant-based resource
Fossil-based material
Naphtha
Equivalence
Second product Ethylene
Fossil-based resource
First product polyethylene
(Ethylene derivative)

Fig.8

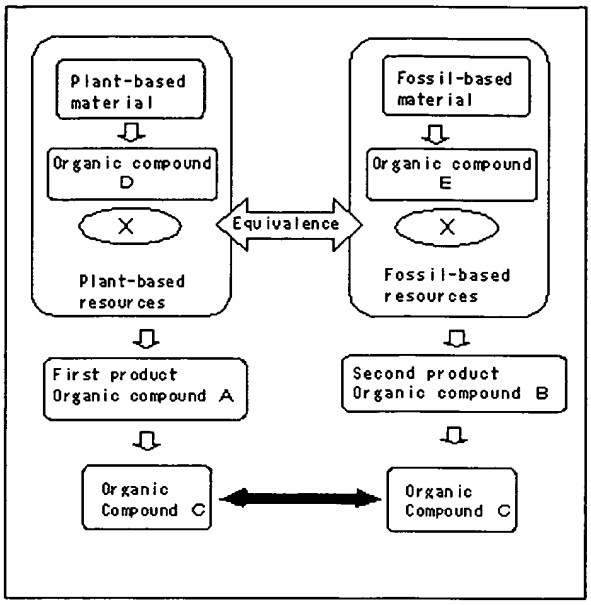

Plant-based material
Organic compound D
X
Plant-based resources
Equivalence
Fossil-based material
Organic compound E
X
Fossil-based resources
First product Organic compound A
Second product Organic compound B
Organic Compound C
Organic Compound C

Fig.9

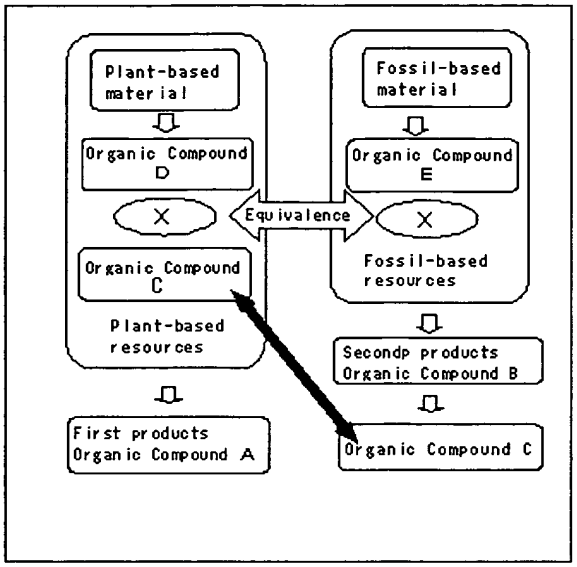

Plant-based material
Organic Compound D
X
Organic Compound C
Plant-based resources
First products Organic Compound A
Fossil-based material
Organic Compound E
Equivalence
X
Fossil-based resources
Secondp products Organic Compound B
Organic Compound C

Fig. 10

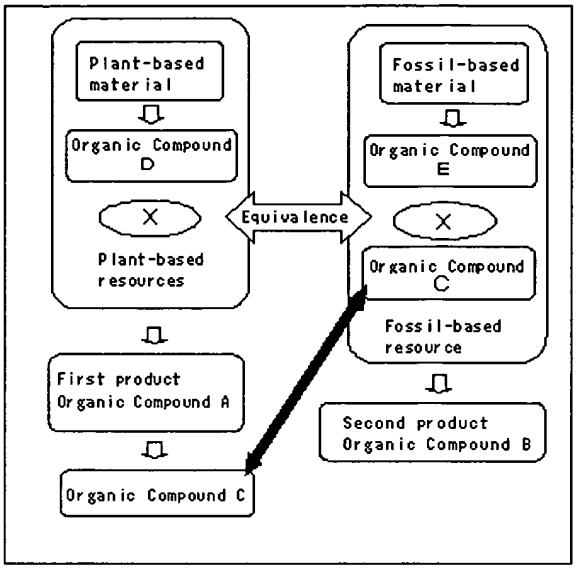

Plant-based material
Organic Compound D
X
Plant-based resources
First product Organic Compound A
Organic Compound C
Equivalence
Fossil-based material
Organic Compound E
X
Organic Compound C
Fossil-based resource
Second product Organic Compound B

Fig.11

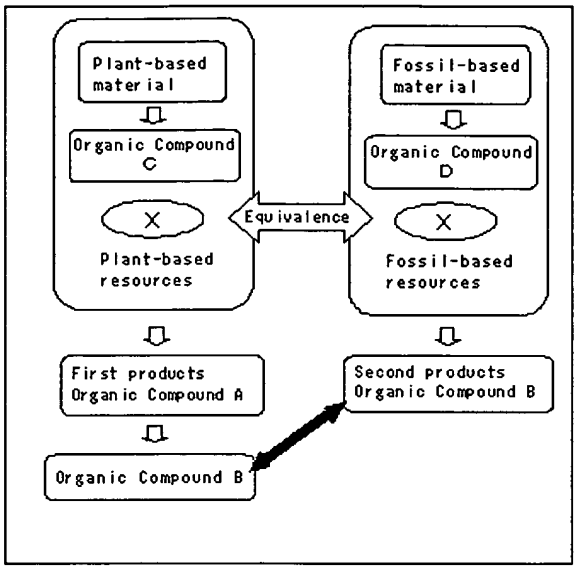

Plant-based material
Organic Compound C
X
Plant-based resources
Equivalence
Fossil-based material
Organic Compound D
X
Fossil-based resources
First products Organic Compound A
Organic Compound B
Second products Organic Compound B

Fig. 12

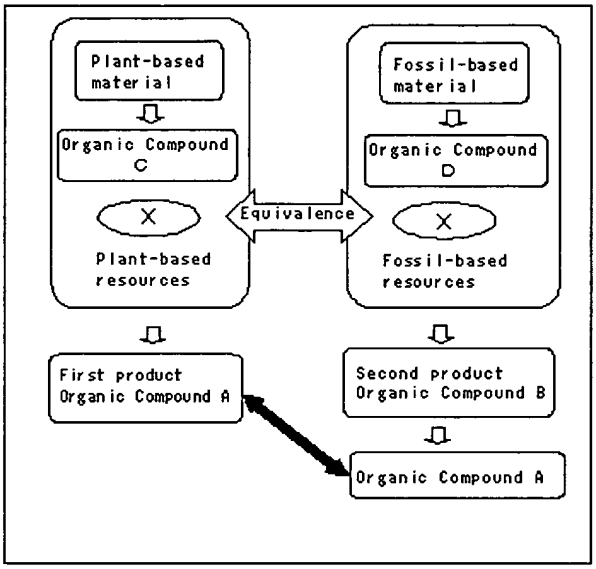

Plant-based material
Organic Compound C
X
Plant-based resources
Equivalence
Fossil-based material
Organic Compound D
X
Fossil-based resources
First product Organic Compound A
Second product Organic Compound B
Organic Compound A

Fig.13

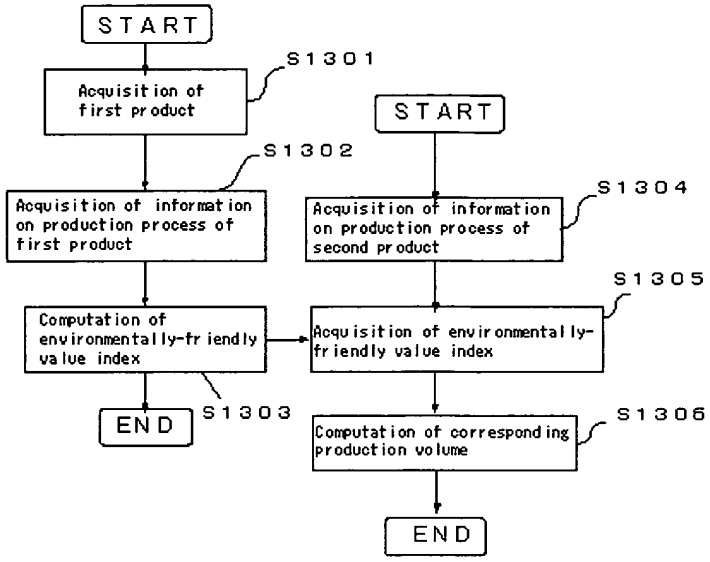

START
S1301
Acquisition of first product
S1302
Acquisition of information on production process of first product
Computation of environmentally-friendly value index
END
S1303
START
S1304
Acquisition of information on production process of second product
S1305
Acquisition of environmentally-friendly value index
S1306
Computation of corresponding production volume
END

Fig.14

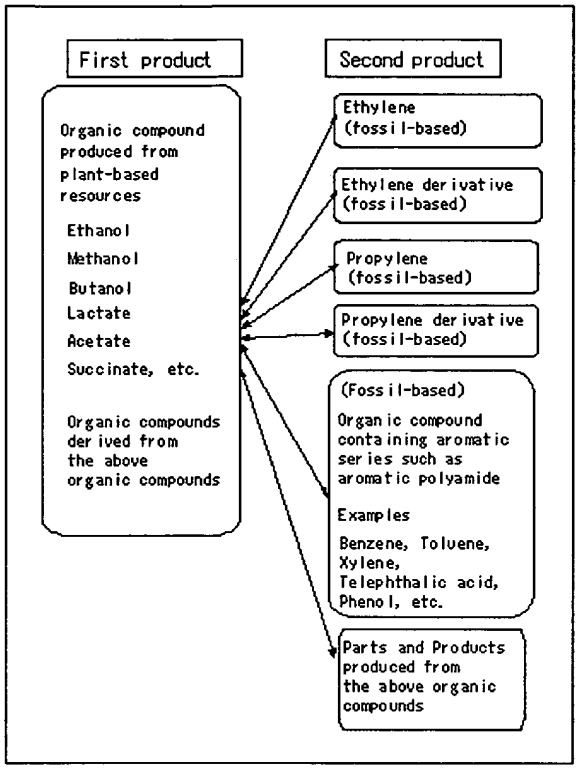

First product
Second product
Organic compound produced from plant-based resources
Ethanol
Methanol
Butanol
Lactate
Acetate
Succinate, etc.
Organic compounds derived from the above organic compounds
Ethylene (fossil-based)
Ethylene derivative (fossil-based)
Propylene (fossil-based)
Propylene derivative (fossil-based)
(Fossil-based)
Organic compound containing aromatic series such as aromatic polyamide
Examples
Benzene, Tolvene, Xylene, Telephthalic acid, Phenol, etc.
Parts and Products produced from the above organic compounds

Fig.15

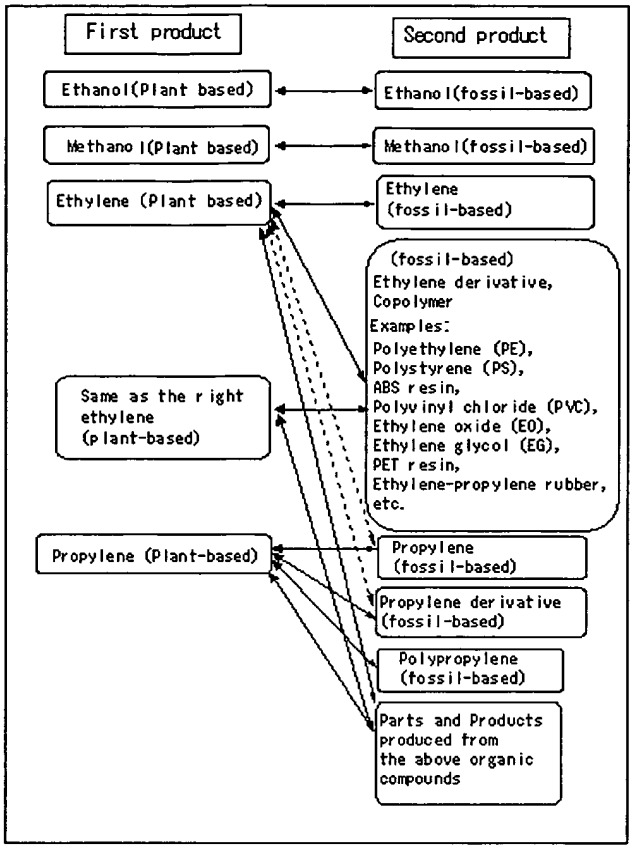

First product
Second product
Ethanol(Plant based)
Ethanol(fossil-based)
Methanol(Plant based)
Methanol(fossil-based)
Ethylene (Plant based)
Ethylene (fossil-based)
(fossil-based) Ethylene derivative, Copolymer
Examples:
Polyethylene (PE), Polystyrene (PS), ABS resin, Polyvinyl chloride (PVC), Ethylene oxide (EO), Ethylene glycol (EG), PET resin, Ethylene-propylene rubber, etc.
Same as the right ethylene (plant-based)
Propylene (Plant-based)
Propylene (fossil-based)
Propylene derivative (fossil-based)
Polypropylene (fossil-based)
Parts and Products produced from the above organic compounds

Fig. 16

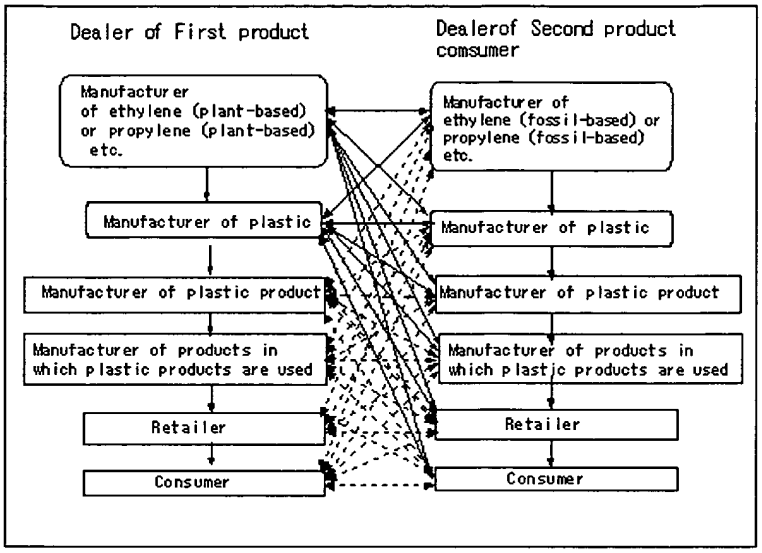

Dealer of First product
Dealerof Second product comsumer
Manufacturer of ethylene (plant-based) or propylene (plant-based) etc.
Manufacturer of ethylene (fossil-based) or propylene (fossil-based) etc.
Manufacturer of plastic
Manufacturer of plastic
Manufacturer of plastic product
Manufacturer of plastic product
Manufacturer of products in which plastic products are used
Manufacturer of products in which plastic products are used
Retailer
Retailer
Consumer
Consumer

Fig.17

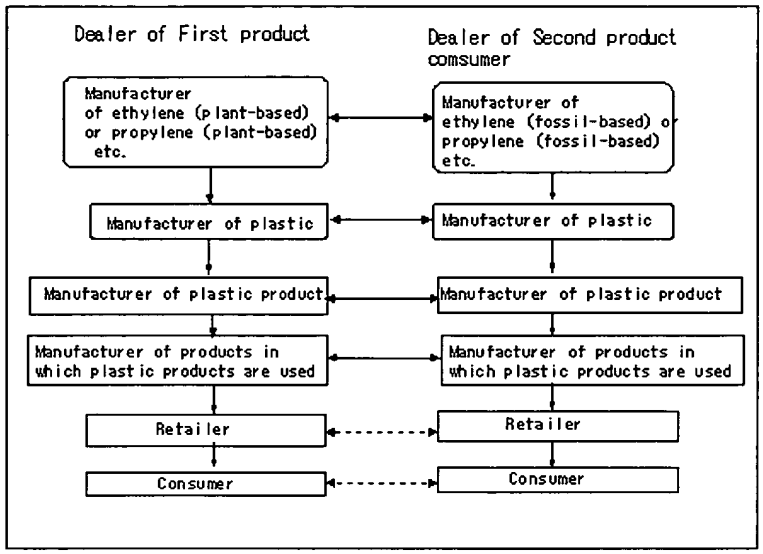

Dealer of First product
Dealer of Second product comsumer
Manufacturer of ethylene (plant-based) or propylene (plant-based) etc.
Manufacturer of ethylene (fossil-based) o propylene (fossil-based) etc.
Manufacturer of plastic
Manufacturer of plastic
Manufacturer of plastic product
Manufacturer of plastic product
Manufacturer of products in which plastic products are used
Manufacturer of products in which plastic products are used
Retailer
Retailer
Consumer
Consumer

Fig. 18

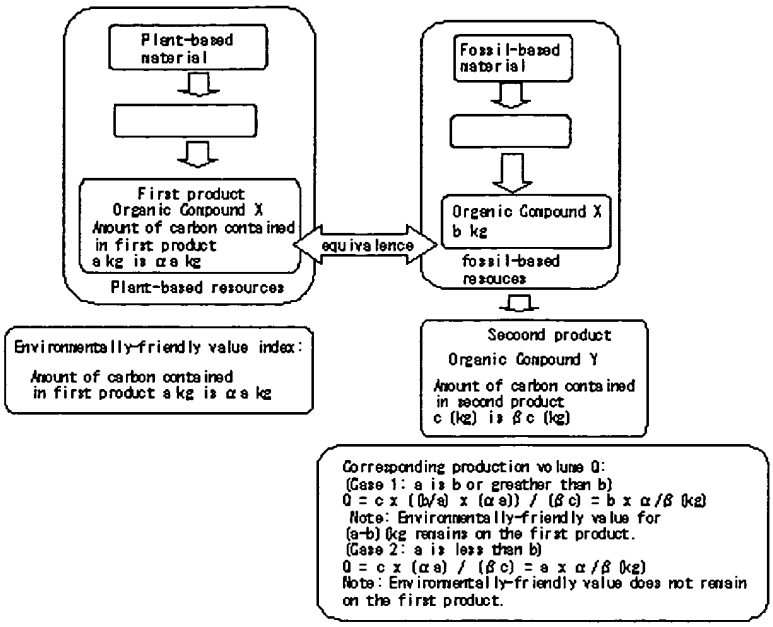

Plant-based material
First product
Organic Compound X
Amount of carbon contained in first product a kg is αa kg
Plant-based resources
equivalence
Fossil-based material
Organic Compound X
b kg
fossil-based resouces
Environmentally-friendly value index:
Amount of carbon contained in first product a kg is αa kg
Secoond product
Organic Compound Y
Amount of carbon contained in second product c (kg) is βc (kg)
Corresponding production volume Q:
(Case 1: a is b or greather than b)
Q = c x ((b/a) x (αa)) / (βc) = b x α/β (kg)
Note: Environmentally-friendly value for (a-b) (kg remains on the first product.
(Case 2: a is less than b)
Q = c x (αa) / (βc) = a x α/β (kg)
Note: Environmentally-friendly value does not remain on the first product.

Fig. 19

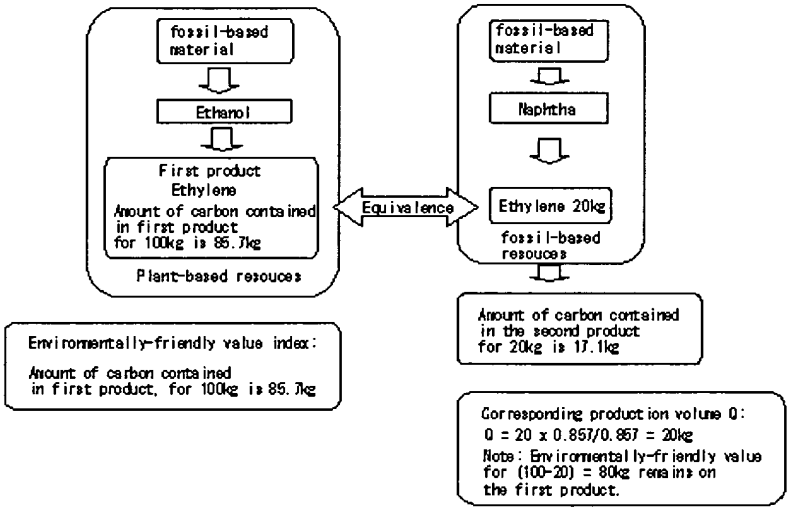

fossil-based material
Ethanol
First product
Ethylene
Amount of carbon contained in first product for 100kg is 85.7kg
Plant-based resouces
Equivalence
fossil-based material
Naphtha
Ethylene 20kg
fossil-based resouces
Environmentally-friendly value index:
Amount of carbon contained in first product, for 100kg is 85.7kg
Amount of carbon contained in the second product for 20kg is 17.1kg
Corresponding production volume Q:
Q = 20 x 0.857/0.857 = 20kg
Note: Environmentally-friendly value for (100-20) = 80kg remains on the first product.

Fig. 20

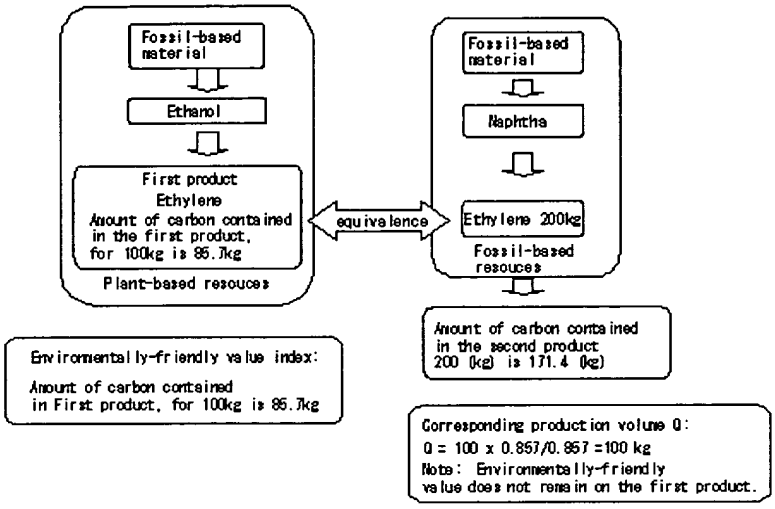

Fossil-based material
Ethanol
First product
Ethylene
Amount of carbon contained in the first product, for 100kg is 85.7kg
Plant-based resouces
equivalence
Fossil-based material
Naphtha
Ethylene 200kg
Fossil-based resouces
Amount of carbon contained in the second product 200 (kg) is 171.4 (kg)
Environmentally-friendly value index:
Amount of carbon contained in First product, for 100kg is 85.7kg
Corresponding production volume Q:
Q = 100 x 0.857/0.857 =100 kg
Note: Environmentally-friendly value does not remain on the first product.

Fig.21

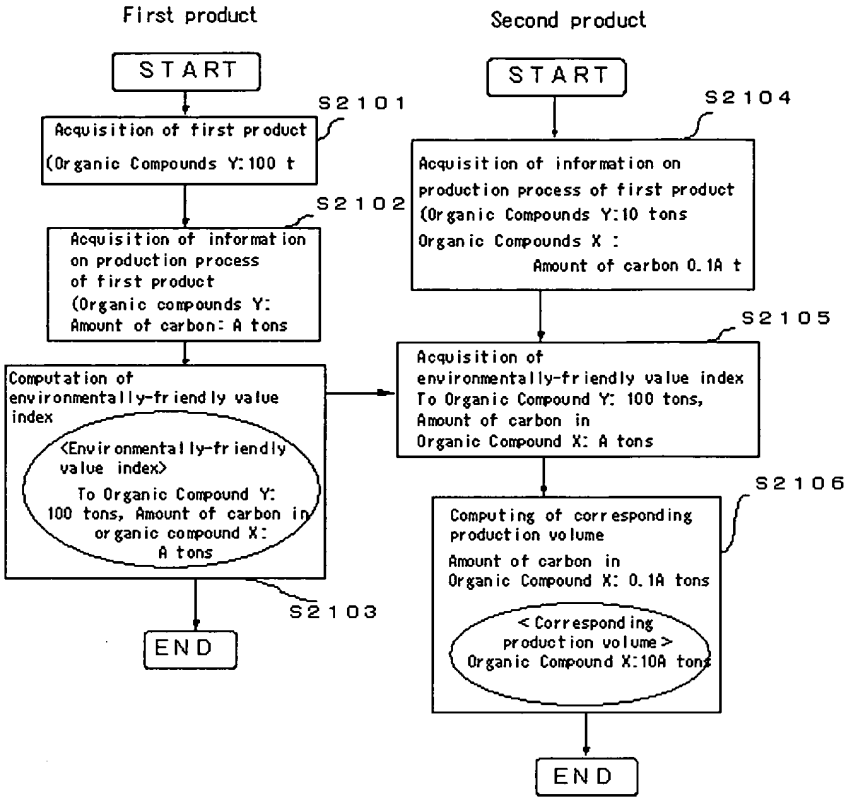

First product
START
S2101
Acquisition of first product
(Organic Compounds Y: 100 t
S2102
Acquisition of information on production process of first product
(Organic compounds Y:
Amount of carbon: A tons
Computation of environmentally-friendly value index
<Environmentally-friendly value index>
To Organic Compound Y: 100 tons, Amount of carbon in organic compound X: A tons
S2103
END
Second product
START
S2104
Acquisition of information on production process of first product
(Organic Compounds Y: 10 tons
Organic Compounds X :
Amount of carbon 0.1A t
S2105
Acquisition of environmentally-friendly value index
To Organic Compound Y: 100 tons,
Amount of carbon in
Organic Compound X: A tons
S2106
Computing of corresponding production volume
Amount of carbon in
Organic Compound X: 0.1A tons
<Corresponding production volume>
Organic Compound X: 10A tons
END

Fig. 22

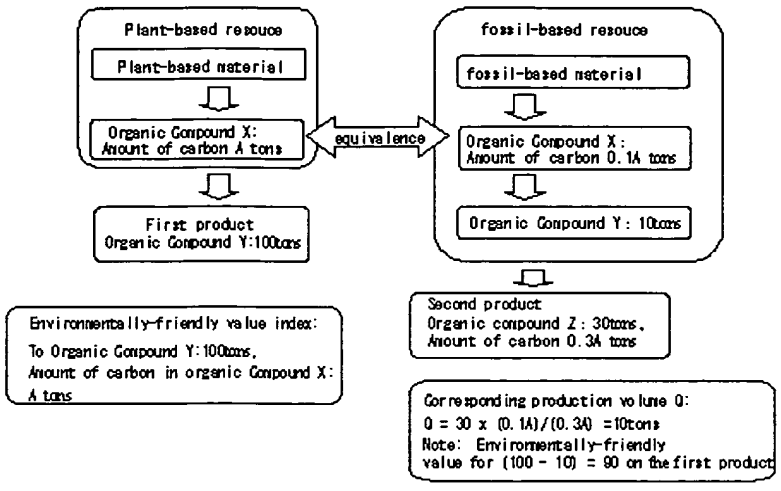

Plant-based resouce
Plant-based material
Organic Compound X:
Amount of carbon A tons
equivalence
fossil-based resouce
fossil-based material
Organic Compound X:
Amount of carbon 0.1A tons
Organic Compound Y: 10tons
First product
Organic Compound Y:100tons
Second product
Organic compound Z: 30tons,
Amount of carbon 0.3A tons
Environmentally-friendly value index:
To Organic Compound Y:100tons,
Amount of carbon in organic Compound X:
A tons
Corresponding production volume Q:
Q = 30 x (0.1A)/(0.3A) =10tons
Note: Environmentally-friendly
value for (100 - 10) = 90 on the first product

Fig.23

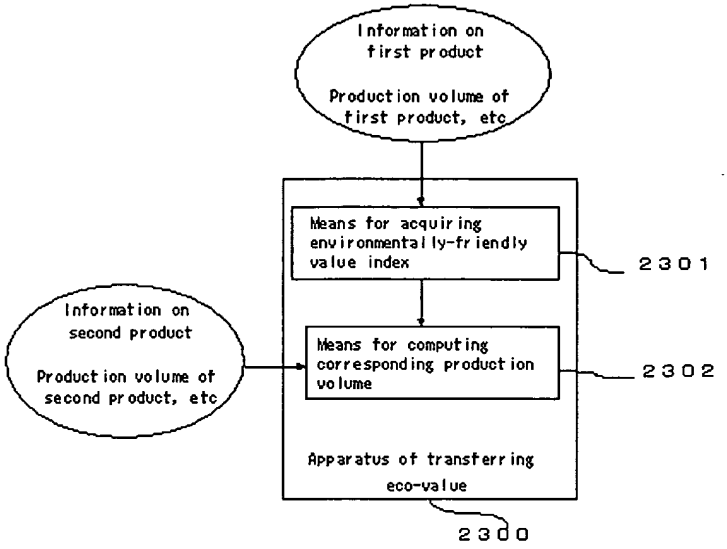

Information on first product
Production volume of first product, etc
Means for acquiring environmentally-friendly value index
2301
Information on second product
Production volume of second product, etc
Means for computing corresponding production volume
2302
Apparatus of transferring eco-value
2300

Fig. 24

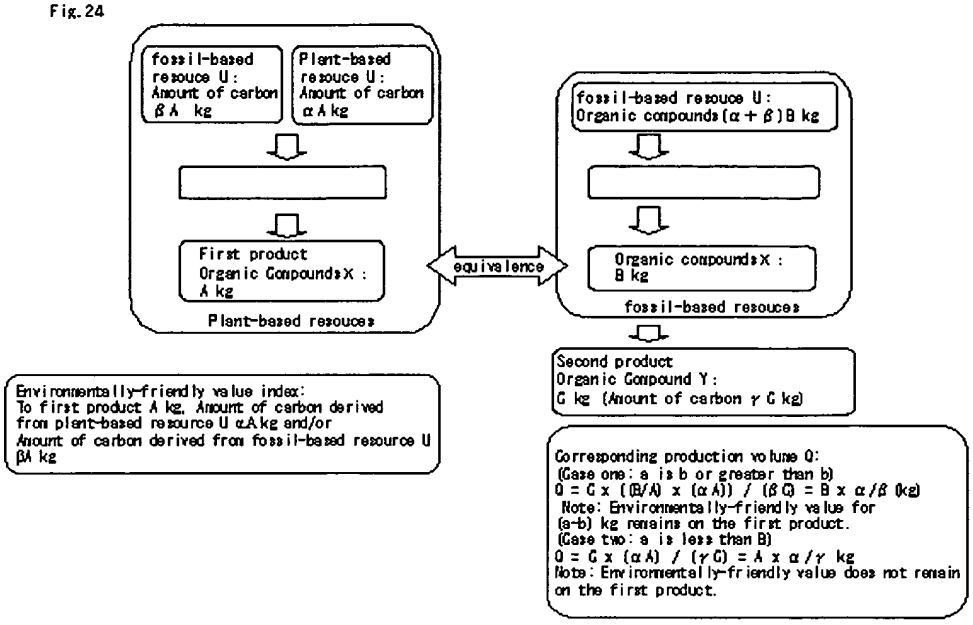

fossil-based resouce U:
Amount of carbon βA kg
Plant-based resouce U:
Amount of carbon αA kg
First product
Organic Compounds X :
A kg
Plant-based resouces
equivalence
fossil-based resouce U:
Organic compounds (α + β) B kg
Organic compounds X :
B kg
fossil-based resouces
Second product
Organic Compound Y:
C kg (Amount of carbon γ C kg)
Environmentally-friendly value index:
To first product A kg, Amount of carbon derived from plant-based resource U αA kg and/or
Amount of carbon derived from fossil-based resource U βA kg
Corresponding production volume Q:
(Case one: a is b or greater than b)
Q = C x ((B/A) x (αA)) / (βC) = B x α/β (kg)
Note: Environmentally-friendly value for (a-b) kg remains on the first product.
(Case two: a is less than B)
Q = C x (αA) / (γC) = A x α/γ kg
Note: Environmentally-friendly value does not remain on the first product.

Fig. 25

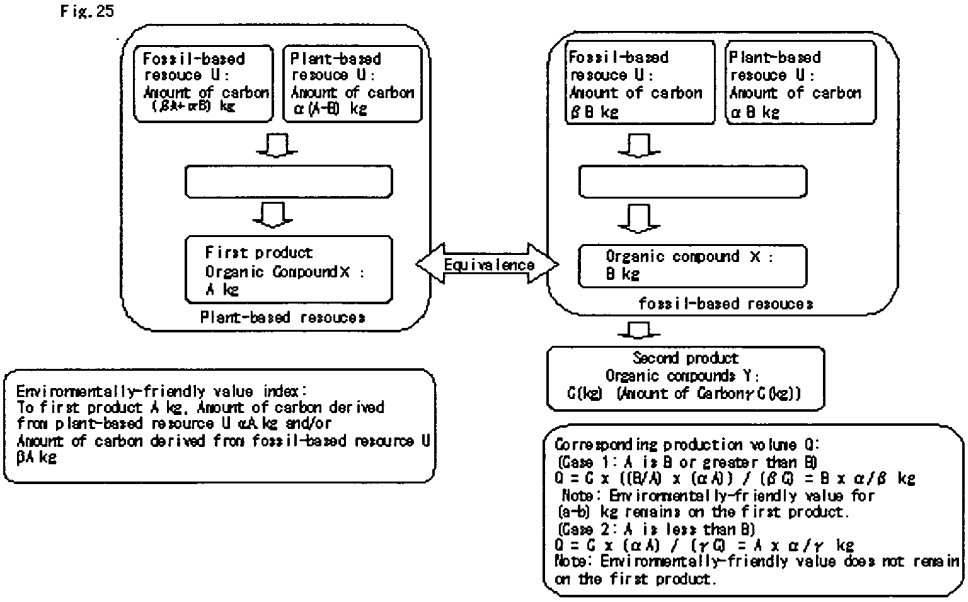

Fossil-based resouce U:
Amount of carbon (βA+αB) kg
Plant-based resouce U:
Amount of carbon α(A-B) kg
First product
Organic Compound X :
A kg
Plant-based resouces
Equivalence
Fossil-based resouce U:
Amount of carbon βB kg
Plant-based resouce U:
Amount of carbon αB kg
Organic compound X :
B kg
fossil-based resouces
Second product
Organic compounds Y:
C(kg) (Amount of Carbonγ C(kg))
Environmentally-friendly value index:
To first product A kg, Amount of carbon derived from plant-based resource U αA kg and/or
Amount of carbon derived from fossil-based resource U βA kg
Corresponding production volume Q:
(Case 1: A is B or greater than B)
Q = C x ((B/A) x (αA)) / (βC) = B x α/β kg
Note: Environmentally-friendly value for (a-b) kg remains on the first product.
(Case 2: A is less than B)
Q = C x (αA) / (γC) = A x α/γ kg
Note: Environmentally-friendly value does not remain on the first product.

Fig. 26

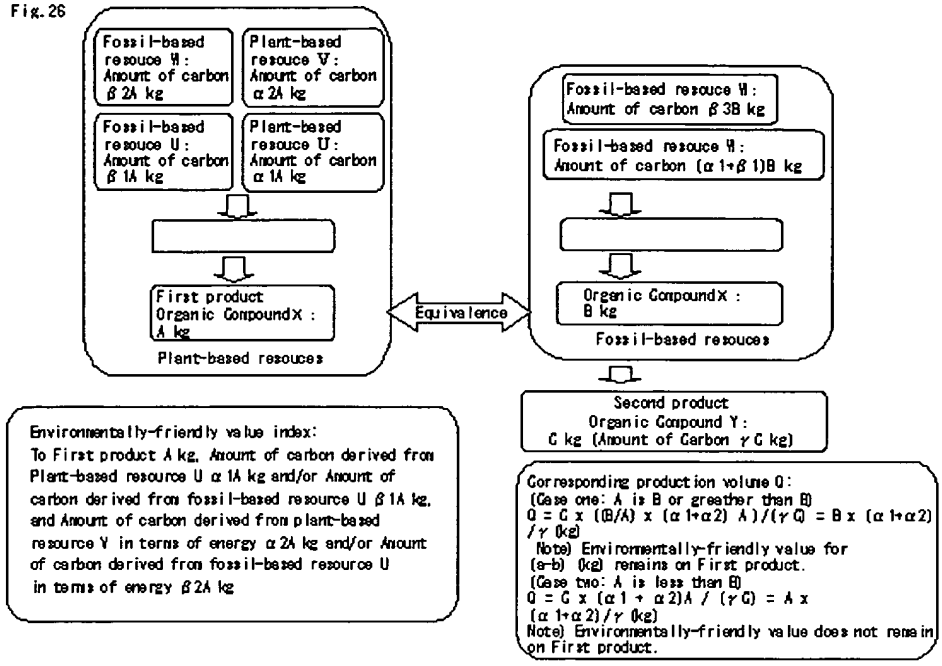

Fossil-based resouce W : Amount of carbon β 2A kg
Plant-based resouce V : Amount of carbon α 2A kg
Fossil-based resouce U : Amount of carbon β 1A kg
Plant-based resouce U : Amount of carbon α 1A kg
First product Organic CompoundX : A kg
Plant-based resouces
Equivalence
Fossil-based resouce W : Amount of carbon β 3B kg
Fossil-based resouce W : Amount of carbon (α 1+β 1)B kg
Orgenic CompoundX : B kg
Fossil-based resouces
Second product Organic Compound Y : C kg (Amount of Carbon γ C kg)
Environmentally-friendly value index: To First product A kg, Amount of carbon derived from Plant-based resource U α 1A kg and/or Amount of carbon derived from fossil-based resource U β 1A kg, and Amount of carbon derived from plant-based resource V in terms of energy α 2A kg and/or Amount of carbon derived from fossil-based resource U in terms of energy β 2A kg
Corresponding production volume Q: (Case one: A is B or greather than B) Q = C x ((B/A) x (α 1+α 2) A)/(γ C) = B x (α 1+α 2) / γ (kg) Note) Environmentally-friendly value for (a-b) (kg) remains on First product. (Case two: A is less than B) Q = C x (α 1 + α 2)A / (γ C) = A x (α 1+α 2) / γ (kg) Note) Environmentally-friendly value does not remain on First product.

Fig. 27

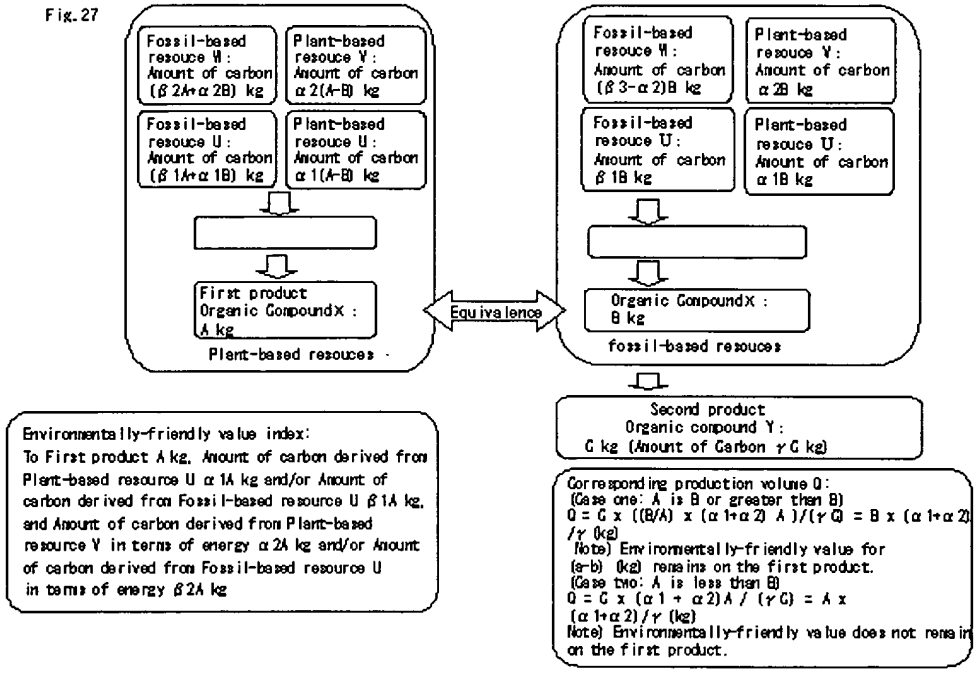

Fossil-based resouce W : Amount of carbon (β 2A+α 2B) kg
Plant-based resouce V : Amount of carbon α 2(A-B) kg
Fossil-based resouce U : Amount of carbon (β 1A+α 1B) kg
Plant-based resouce U : Amount of carbon α 1(A-B) kg
First product Organic CompoundX : A kg
Plant-based resouces
Equivalence
Fossil-based resouce W : Amount of carbon (β 3-α 2)B kg
Plant-based resouce V : Amount of carbon α 2B kg
Fossil-based resouce U : Amount of carbon β 1B kg
Plant-based resouce U : Amount of carbon α 1B kg
Organic CompoundX : B kg
fossil-based resouces
Second product Organic compound Y : C kg (Amount of Carbon γ C kg)
Environmentally-friendly value index: To First product A kg, Amount of carbon derived from Plant-based resource U α 1A kg and/or Amount of carbon derived from Fossil-based resource U β 1A kg, and Amount of carbon derived from Plant-based resource V in terms of energy α 2A kg and/or Amount of carbon derived from Fossil-based resource U in terms of energy β 2A kg
Corresponding production volume Q: (Case one: A is B or greater than B) Q = C x ((B/A) x (α 1+α 2) A)/(γ C) = B x (α 1+α 2) / γ (kg) Note) Environmentally-friendly value for (a-b) (kg) remains on the first product. (Case two: A is less than B) Q = C x (α 1 + α 2)A / (γ C) = A x (α 1+α 2) / γ (kg) Note) Environmentally-friendly value does not remain on the first product.

Fig. 28

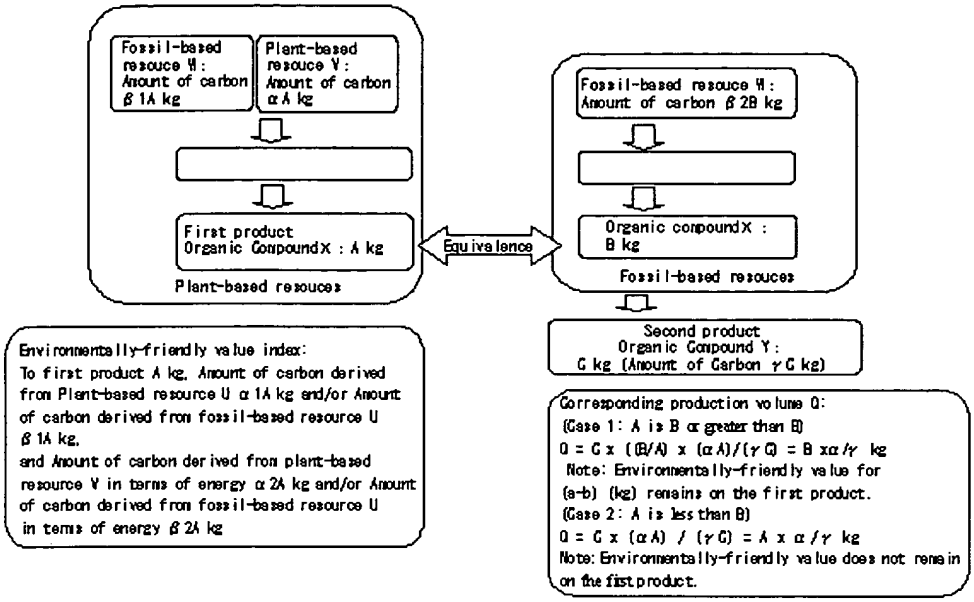

Fossil-based resouce U: Amount of carbon β 1A kg
Plant-based resouce V: Amount of carbon α A kg
First product Organic CompoundX : A kg
Plant-based resouces
Equivalence
Fossil-based resouce U: Amount of carbon β 2B kg
Organic compoundX : B kg
Fossil-based resouces
Second product Organic Compound Y: G kg (Amount of Carbon γ G kg)
Environmentally-friendly value index:
To first product A kg, Amount of carbon derived from Plant-based resource U α 1A kg and/or Amount of carbon derived from fossil-based resource U β 1A kg,
and Amount of carbon derived from plant-based resource V in terms of energy α 2A kg and/or Amount of carbon derived from fossil-based resource U in terms of energy β 2A kg
Corresponding production volume Q:
(Case 1: A is B or greater than B)
Q = G x ((B/A) x (α A)/(γ G) = B xα/γ kg
Note: Environmentally-friendly value for (a-b) (kg) remains on the first product.
(Case 2: A is less than B)
Q = G x (α A) / (γ G) = A x α/γ kg
Note: Environmentally-friendly value does not remain on the first product.

Fig. 29

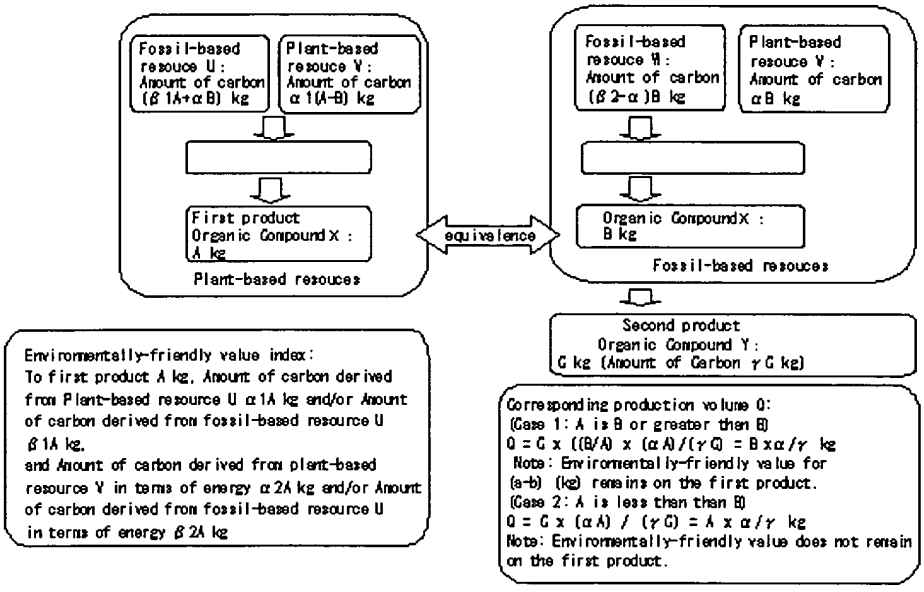

Fossil-based resouce U: Amount of carbon (β 1A+α B) kg
Plant-based resouce V: Amount of carbon α 1(A-B) kg
First product Organic CompoundX : A kg
Plant-based resouces
equivalence
Fossil-based resouce U: Amount of carbon (β 2-α)B kg
Plant-based resouce V: Amount of carbon α B kg
Organic CompoundX : B kg
Fossil-based resouces
Second product Organic Compound Y: G kg (Amount of Carbon γ G kg)
Environmentally-friendly value index:
To first product A kg, Amount of carbon derived from Plant-based resource U α 1A kg and/or Amount of carbon derived from fossil-based resource U β 1A kg,
and Amount of carbon derived from plant-based resource V in terms of energy α 2A kg and/or Amount of carbon derived from fossil-based resource U in terms of energy β 2A kg
Corresponding production volume Q:
(Case 1: A is B or greater than B)
Q = G x ((B/A) x (α A)/(γ G) = B xα/γ kg
Note: Environmentally-friendly value for (a-b) (kg) remains on the first product.
(Case 2: A is less than than B)
Q = G x (α A) / (γ G) = A x α/γ kg
Note: Environmentally-friendly value does not remain on the first product.

Fig. 30

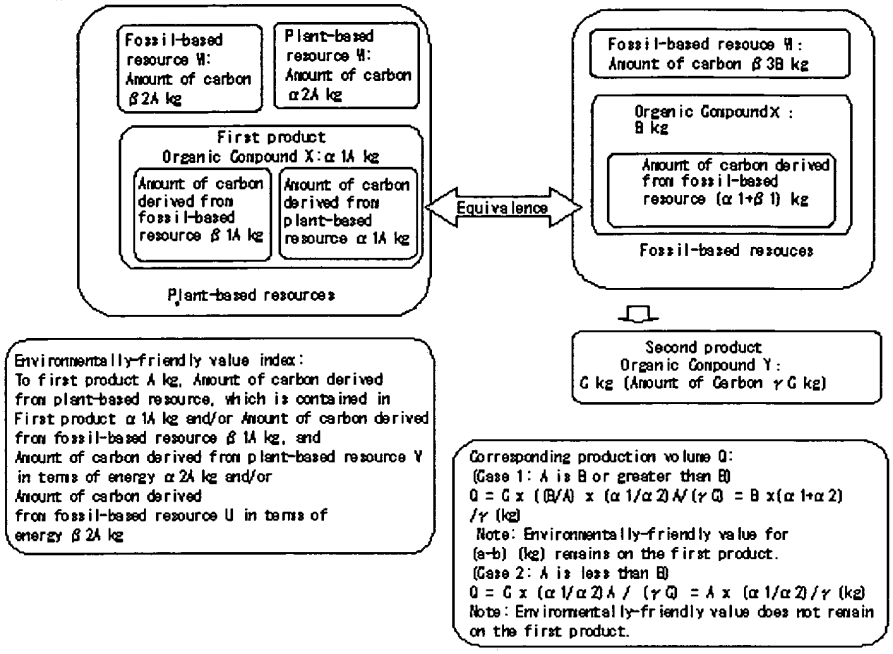

Fossil-based resource W: Amount of carbon β2A kg
Plant-based resource W: Amount of carbon α2A kg
First product Organic Compound X: α1A kg
Amount of carbon derived from fossil-based resource β1A kg
Amount of carbon derived from plant-based resource α1A kg
Plant-based resources
Equivalence
Fossil-based resouce W: Amount of carbon β3B kg
Organic CompoundX: B kg
Amount of carbon derived from fossil-based resource (α1+β1) kg
Fossil-based resouces
Second product Organic Compound Y: C kg (Amount of Carbon γC kg)
Environmentally-friendly value index: To first product A kg, Amount of carbon derived from plant-based resource, which is contained in First product α1A kg and/or Amount of carbon derived from fossil-based resource β1A kg, and Amount of carbon derived from plant-based resource V in terms of energy α2A kg and/or Amount of carbon derived from fossil-based resource U in terms of energy β2A kg
Corresponding production volume Q: (Case 1: A is B or greater than B) Q = C x (B/A) x (α1/α2)A/(γC) = B x(α1+α2) /γ (kg) Note: Environmentally-friendly value for (a-b) (kg) remains on the first product. (Case 2: A is less than B) Q = C x (α1/α2)A / (γC) = A x (α1/α2)/γ (kg) Note: Environmentally-friendly value does not remain on the first product.

Fig. 31

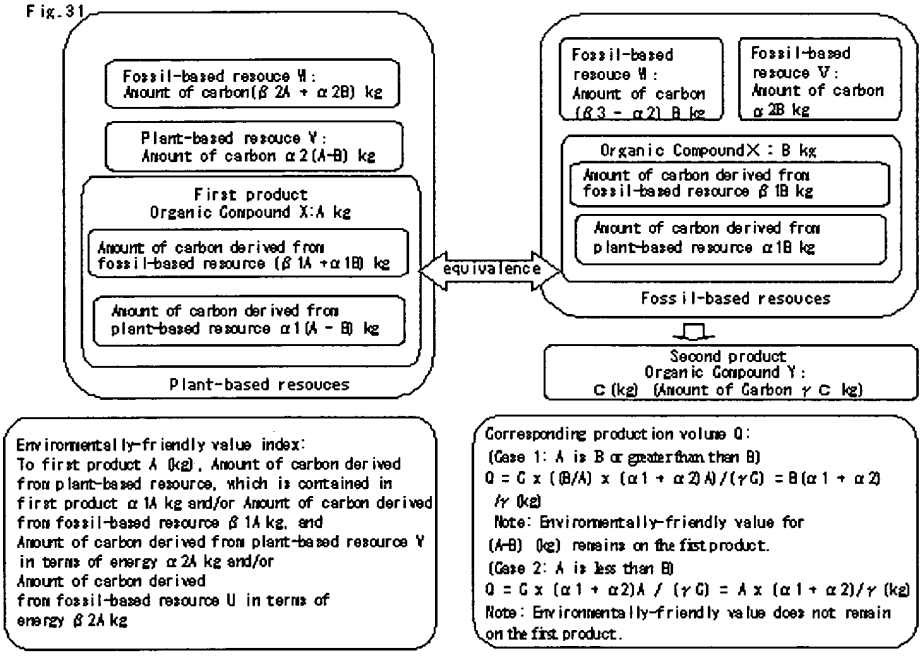

Fossil-based resouce W: Amount of carbon(β2A + α2B) kg
Plant-based resouce V: Amount of carbon α2(A-B) kg
First product Organic Compound X:A kg
Amount of carbon derived from fossil-based resource (β1A +α1B) kg
Amount of carbon derived from plant-based resource α1(A - B) kg
Plant-based resouces
equivalence
Fossil-based resouce W: Amount of carbon (β3 - α2) B kg
Fossil-based resouce V: Amount of carbon α2B kg
Organic CompoundX : B kg
Amount of carbon derived from fossil-based resource β1B kg
Amount of carbon derived from plant-based resource α1B kg
Fossil-based resouces
Second product Organic Compound Y: C (kg) (Amount of Carbon γC kg)
Environmentally-friendly value index: To first product A (kg), Amount of carbon derived from plant-based resource, which is contained in first product α1A kg and/or Amount of carbon derived from fossil-based resource β1A kg, and Amount of carbon derived from plant-based resource V in terms of energy α2A kg and/or Amount of carbon derived from fossil-based resource U in terms of energy β2A kg
Corresponding production volume Q: (Case 1: A is B or greaterthan than B) Q = C x (B/A) x (α1 + α2)A/(γC) = B(α1 + α2) /γ (kg) Note: Environmentally-friendly value for (A-B) (kg) remains on the first product. (Case 2: A is less than B) Q = C x (α1 + α2)A / (γC) = A x (α1 + α2)/γ (kg) Note: Environmentally-friendly value does not remain on the first product.

Fig.32

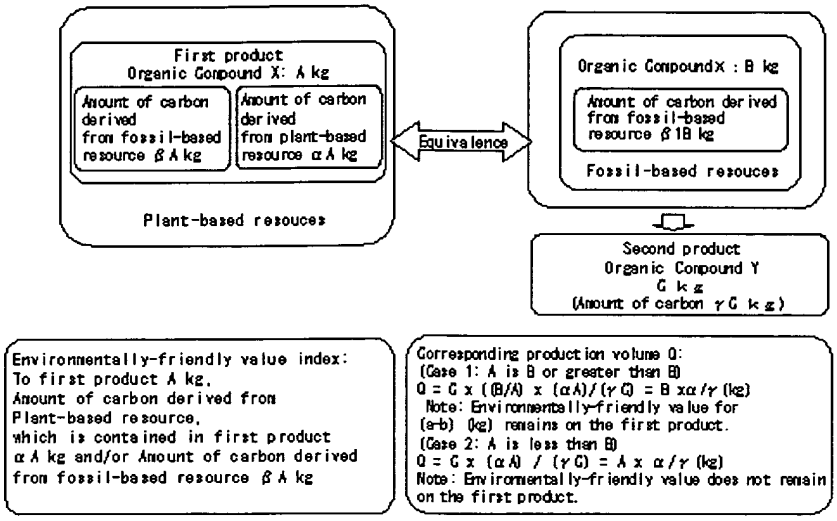

First product
Organic Compound X: A kg
Amount of carbon derived from fossil-based resource βA kg
Amount of carbon derived from plant-based resource αA kg
Plant-based resouces
Equivalence
Organic CompoundX : B kg
Amount of carbon derived from fossil-based resource βB kg
Fossil-based resouces
Second product
Organic Compound Y
C kg
(Amount of carbon γC kg)
Environmentally-friendly value index:
To first product A kg,
Amount of carbon derived from
Plant-based resource,
which is contained in first product
αA kg and/or Amount of carbon derived
from fossil-based resource βA kg
Corresponding production volume Q:
(Case 1: A is B or greater than B)
Q = C x ((B/A) x (αA)/(γC) = B xα/γ (kg)
Note: Environmentally-friendly value for
(a-b) (kg) remains on the first product.
(Case 2: A is less than B)
Q = C x (αA) / (γC) = A x α/γ (kg)
Note: Environmentally-friendly value does not remain
on the first product.

Fig.33

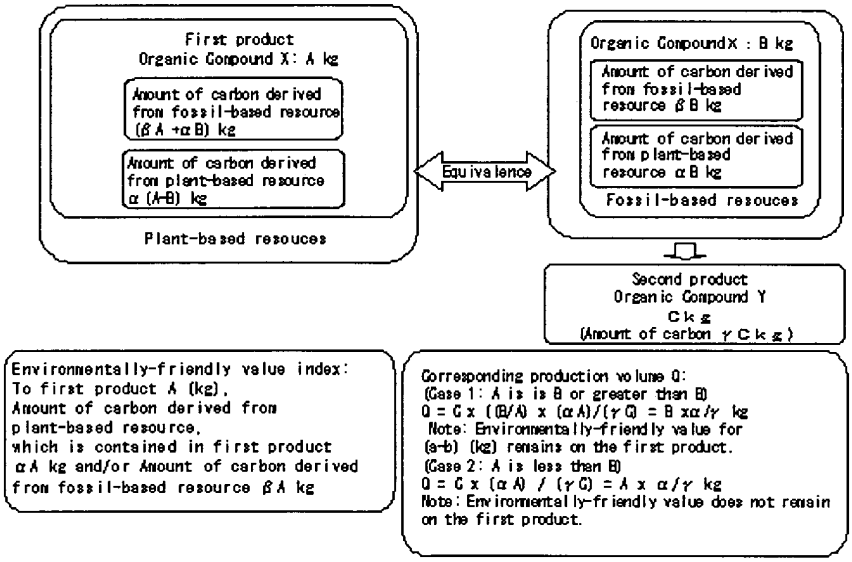

First product
Organic Compound X: A kg
Amount of carbon derived from fossil-based resource (βA +αB) kg
Amount of carbon derived from plant-based resource α (A-B) kg
Plant-based resouces
Equivalence
Organic CompoundX : B kg
Amount of carbon derived from fossil-based resource βB kg
Amount of carbon derived from plant-based resource αB kg
Fossil-based resouces
Second product
Organic Compound Y
C kg
(Amount of carbon γC kg)
Environmentally-friendly value index:
To first product A (kg),
Amount of carbon derived from
plant-based resource,
which is contained in first product
αA kg and/or Amount of carbon derived
from fossil-based resource βA kg
Corresponding production volume Q:
(Case 1: A is is B or greater than B)
Q = C x ((B/A) x (αA)/(γC) = B xα/γ kg
Note: Environmentally-friendly value for
(a-b) (kg) remains on the first product.
(Case 2: A is less than B)
Q = C x (αA) / (γC) = A x α/γ kg
Note: Environmentally-friendly value does not remain
on the first product.

Fig. 34

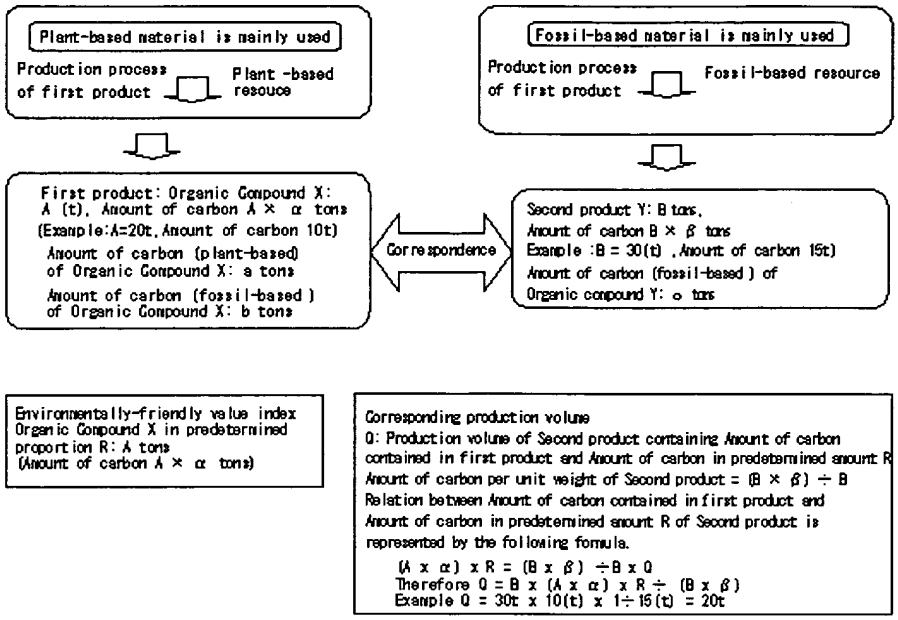

Plant-based material is mainly used
Production process of first product
Plant -based resouce
Fossil-based material is mainly used
Production process of first product
Fossil-based resource
First product: Organic Compound X: A (t), Amount of carbon A × α tons
(Example:A=20t, Amount of carbon 10t)
Amount of carbon (plant-based) of Organic Compound X: a tons
Amount of carbon (fossil-based) of Organic Compound X: b tons
Correspondence
Second product Y: B tons, Amount of carbon B × β tons
Example :B = 30(t) , Amount of carbon 15t)
Amount of carbon (fossil-based) of Organic compound Y: o tons
Environmentally-friendly value index Organic Compound X in predetermined proportion R: A tons (Amount of carbon A × α tons)
Corresponding production volume
Q: Production volume of Second product containing Amount of carbon contained in first product and Amount of carbon in predetermined amount R
Amount of carbon per unit weight of Second product = (B × β) ÷ B
Relation between Amount of carbon contained in first product and Amount of carbon in predetermined amount R of Second product is represented by the following formula.
(A x α) x R = (B x β) ÷B x Q
Therefore Q = B x (A x α) x R ÷ (B x β)
Example Q = 30t x 10(t) x 1÷15(t) = 20t

Fig. 35

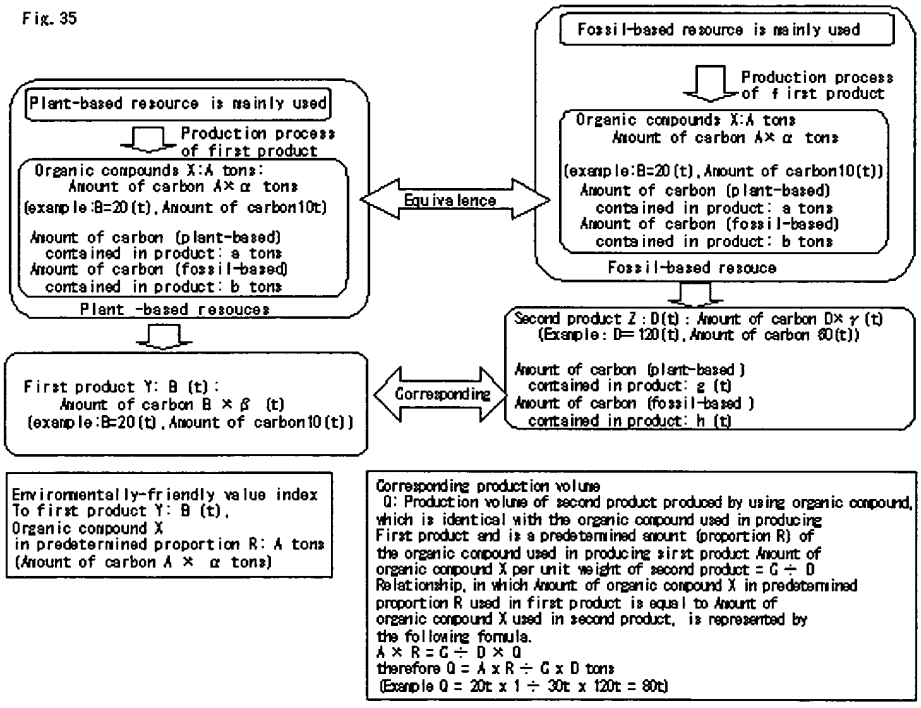
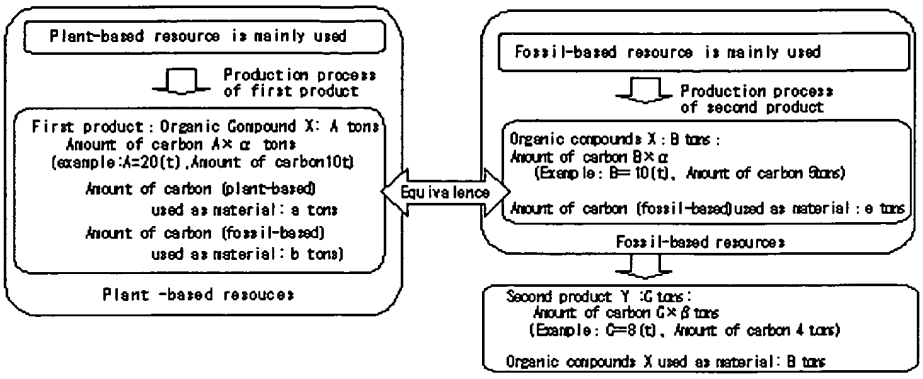

Fossil-based resource is mainly used
Production process of first product
Organic compounds X:A tons
Amount of carbon A× α tons
(exanple:B=20(t), Amount of carbon10(t))
Amount of carbon (plant-based) contained in product: a tons
Amount of carbon (fossil-based) contained in product: b tons
Fossil-based resouce
Plant-based resource is mainly used
Production process of first product
Organic compounds X:A tons:
Amount of carbon A× α tons
(exanple:B=20(t), Amount of carbon10t)
Amount of carbon (plant-based) contained in product: a tons
Amount of carbon (fossil-based) contained in product: b tons
Plant -based resouces
Equivalence
Second product Z : D(t) : Amount of carbon D× γ (t)
(Example: D= 120(t), Amount of carbon 60(t))
Amount of carbon (plant-based) contained in product: g (t)
Amount of carbon (fossil-based) contained in product: h (t)
First product Y: B (t) :
Amount of carbon B × β (t)
(exanple:B=20(t), Amount of carbon10(t))
Corresponding
Enviromentally-friendly value index To first product Y: B (t), Organic compound X in predetermined proportion R: A tons (Amount of carbon A × α tons)
Corresponding production volume
Q: Production volume of second product produced by using organic compound, which is identical with the organic compound used in producing First product and is a predetermined amount (proportion R) of the organic compound used in producing first product Amount of organic compound X per unit weight of second product = C ÷ D
Relationship, in which Amount of organic compound X in predetermined proportion R used in first product is equal to Amount of organic compound X used in second product, is represented by the following formula.
A × R = C ÷ D × Q
therefore Q = A x R ÷ C x D tons
(Example Q = 20t x 1 ÷ 30t x 120t = 80t)

Fig. 36



Environmentally-friendly value index first product Y in predetermined proportion R: A tons
(Amount of carbon A × α tons)

Corresponding production volume
Q: Production volume of second product produced from fossil-based resource, which is identical with the fossil-based resource of first product and of which amount is the amount in predetermined proportion R
Relation between Amount of organic compound X as first product and Amount of Organic Compound X, identical with the organic compound as first product, used in Second product in predetermined proportion R; is represented by the following formula.
(However, since second product is 8 tons, production volume of second product to production volume of first product, for10 tons becomes 8 tons)

Fig.37

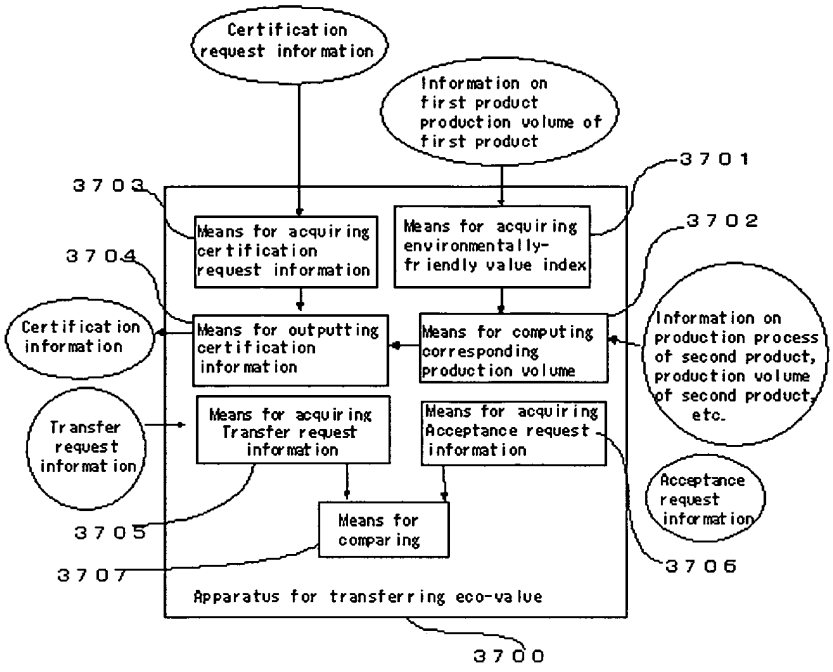

Certification request information
Information on first product production volume of first product
3701
3703
3702
3704
Means for acquiring certification request information
Means for acquiring environmentally-friendly value index
Certification information
Means for outputting certification information
Means for computing corresponding production volume
Information on production process of second product, production volume of second product, etc.
Transfer request information
Means for acquiring Transfer request information
Means for acquiring Acceptance request information
Acceptance request information
3705
Means for comparing
3706
3707
Apparatus for transferring eco-value
3700

Fig.38

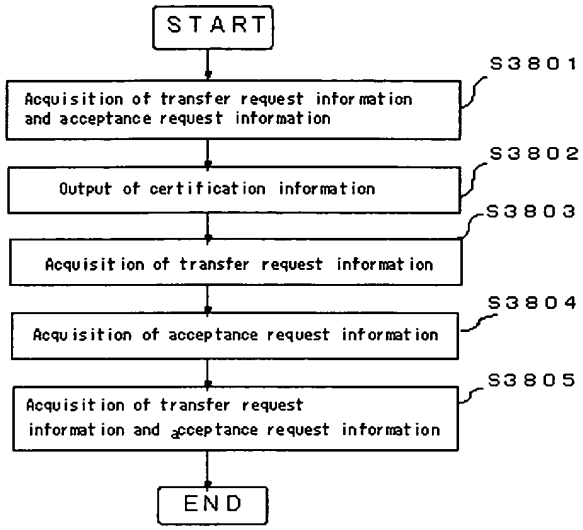

START
S3801
Acquisition of transfer request information and acceptance request information
S3802
Output of certification information
S3803
Acquisition of transfer request information
S3804
Acquisition of acceptance request information
S3805
Acquisition of transfer request information and acceptance request information
END

Fig. 39

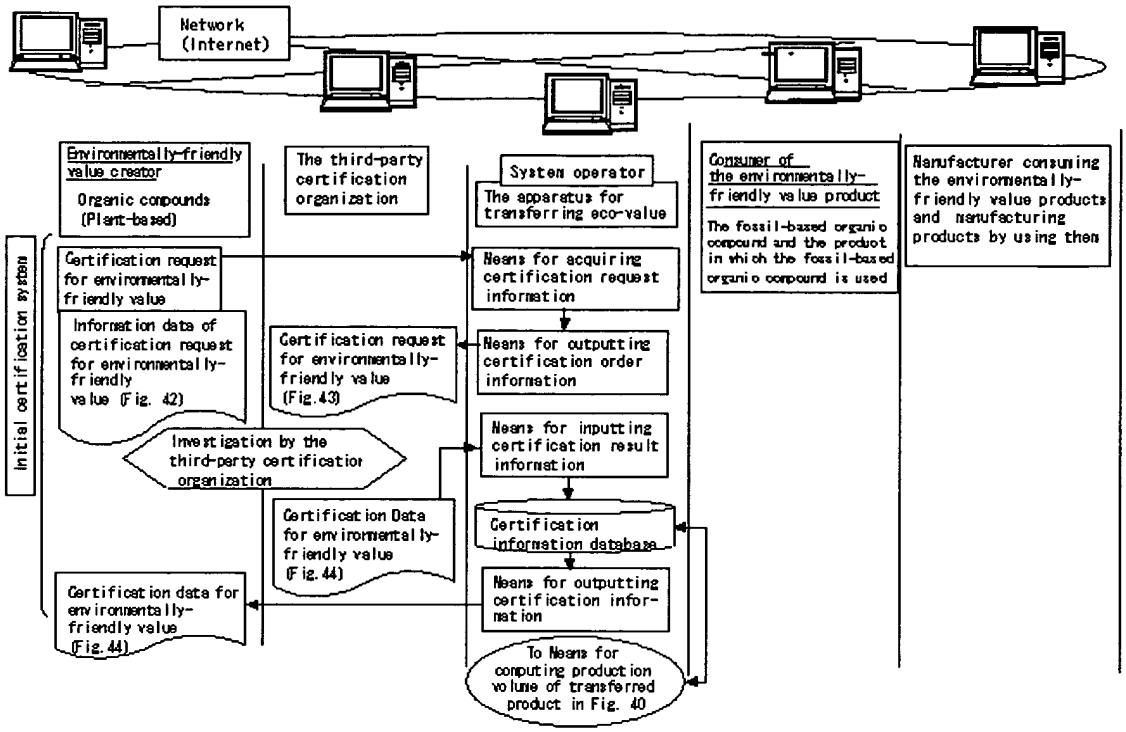

Network (Internet)
Environmentally-friendly value creator
Organic compounds (Plant-based)
The third-party certification organization
System operator
The apparatus for transferring eco-value
Consumer of the environmentally-friendly value product
The fossil-based organic compound and the product in which the fossil-based organic compound is used
Manufacturer consuming the environmentally-friendly value products and manufacturing products by using them
Initial certification system
Certification request for environmentally-friendly value
Information data of certification request for environmentally-friendly value (Fig. 42)
Means for acquiring certification request information
Means for outputting certification order information
Certification request for environmentally-friendly value (Fig. 43)
Investigation by the third-party certification organization
Means for inputting certification result information
Certification Data for environmentally-friendly value (Fig. 44)
Certification information database
Means for outputting certification information
Certification data for environmentally-friendly value (Fig. 44)
To Means for computing production volume of transferred product in Fig. 40

Fig. 40

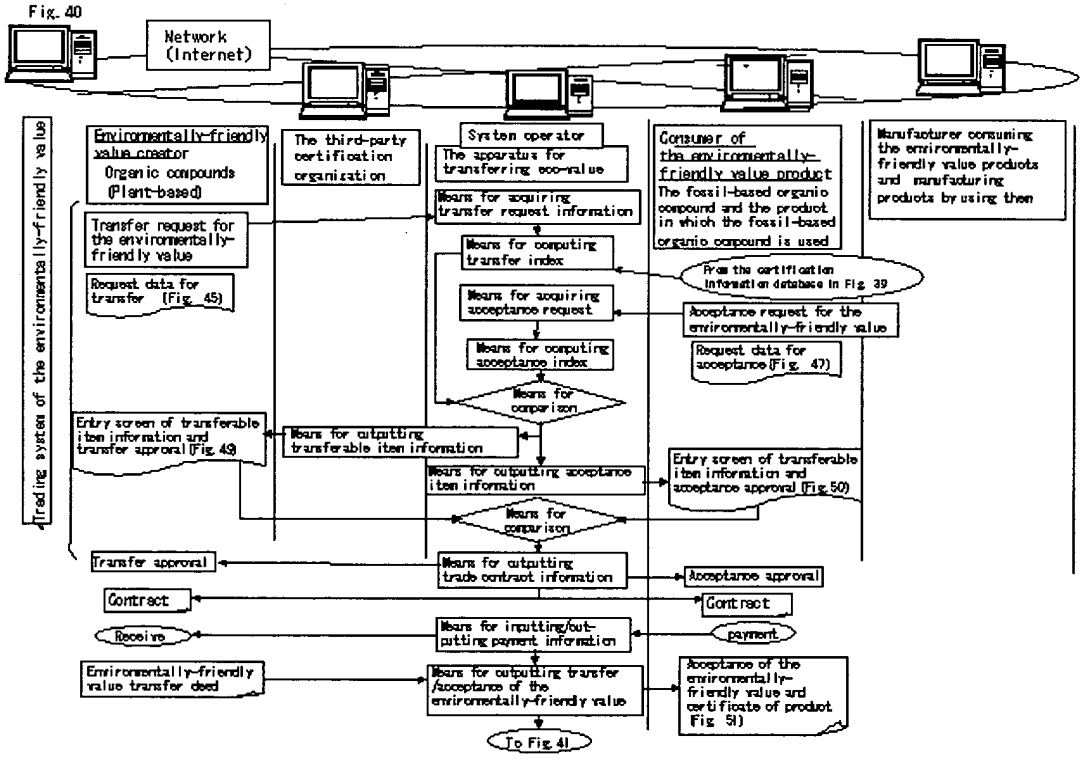

Network (Internet)
Trading system of the environmentally-friendly value
Environmentally-friendly value creator
Organic compounds (Plant-based)
The third-party certification organization
System operator
The apparatus for transferring eco-value
Consumer of the environmentally-friendly value product
The fossil-based organic compound and the product in which the fossil-based organic compound is used
Manufacturer consuming the environmentally-friendly value products and manufacturing products by using them
Transfer request for the environmentally-friendly value
Request data for transfer (Fig. 45)
Means for acquiring transfer request information
Means for computing transfer index
From the certification information database in Fig. 39
Means for acquiring acceptance request
Acceptance request for the environmentally-friendly value
Means for computing acceptance index
Request data for acceptance (Fig. 47)
Means for comparison
Entry screen of transferable item information and transfer approval (Fig. 49)
Means for outputting transferable item information
Means for outputting acceptance item information
Entry screen of transferable item information and acceptance approval (Fig. 50)
Means for comparison
Transfer approval
Means for outputting trade contract information
Acceptance approval
Contract
Contract
Receive
Means for inputting/outputting payment information
payment
Environmentally-friendly value transfer deed
Means for outputting transfer /acceptance of the environmentally-friendly value
Acceptance of the environmentally-friendly value and certificate of product (Fig. 51)
To Fig. 41

Fig. 41

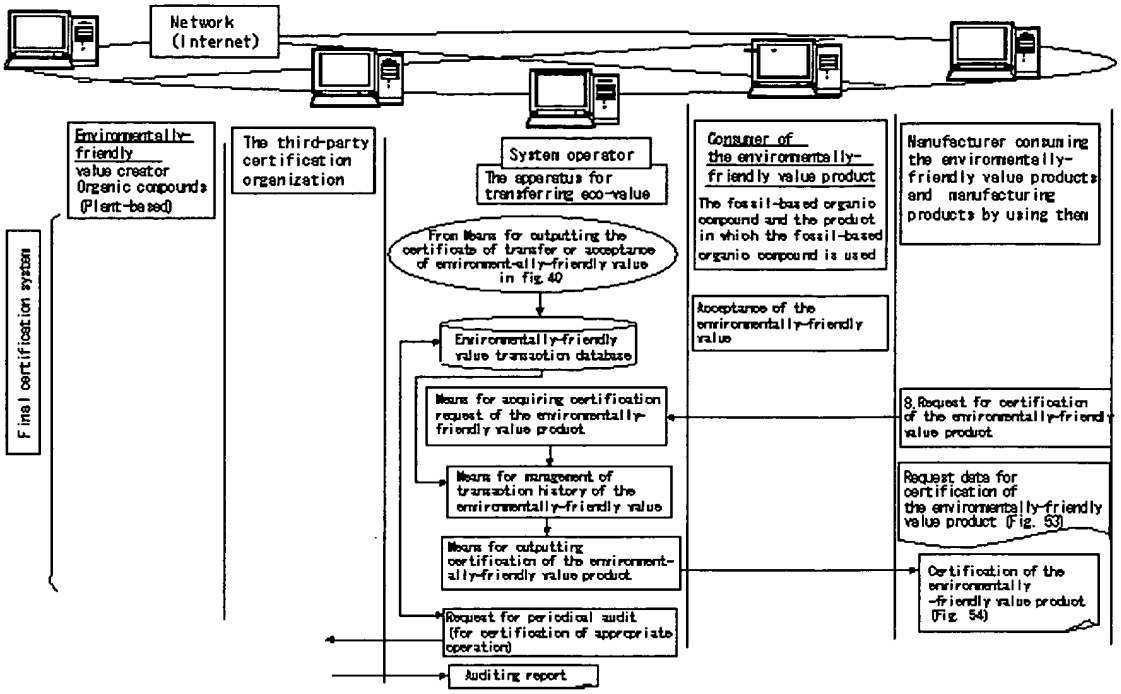

Network (Internet)
Environmentally-friendly value creator Organic compounds (Plant-based)
The third-party certification organization
System operator
The apparatus for transferring eco-value
Consumer of the environmentally-friendly value product
The fossil-based organic compound and the product in which the fossil-based organic compound is used
Manufacturer consuming the environmentally-friendly value products and manufacturing products by using them
Final certification system
From Means for outputting the certificate of transfer or acceptance of environment-ally-friendly value in fig. 40
Environmentally-friendly value transaction database
Means for acquiring certification request of the environmentally-friendly value product
Acceptance of the environmentally-friendly value
8. Request for certification of the environmentally-friendly value product
Means for management of transaction history of the environmentally-friendly value
Request data for certification of the environmentally-friendly value product (Fig. 53)
Means for outputting certification of the environment-ally-friendly value product
Certification of the environmentally -friendly value product (Fig. 54)
Request for periodical audit (for certification of appropriate operation)
Auditing report

Fig.42

Environmentally-friendly Value Certification Data

(Entry screen)

Client ID: XXXXXX

Client name : XX Co.

We request for acquisition of an environmentally-friendly value certification by a third party with respect to the following items:

1) Substance for environmental value certification (e.g. ethylene (plant-based))
2) Certification items of environmentally-friendly value
 -1 Origin of carbon contained in the object substance
 (Is carbon contained in ethylene plant- or fossil-based?)
 -2 Energy amount and energy source for production of the object substance
 (e.g. Electric power: X kwh/kg ethylene (thermal power 90% and hydroelectric power 10%) Heavy oil: X l/kg ethylene
3) Quantity (e.g. ethylene 100 (kg))
4) Production history of the object substance
 -1 Date of production
 -2 Lot No. of products
 -3 Name of factory and the address thereof
 -4 Name of plant material
 -5 Origin of plant material and the manufacturer thereof
 -6 Production process (e.g. sugar → ethanol → ethylene)
 -7 Amount and source of energy for production
5) Usage for the object substance
 (e.g., used for production of PE, PS, PET)
6) Secondary user of the object substance
 (e.g. X Plastic Industry Co., Y Plant)

Fig.43

Environmentally-friendly Value Certification Ordering Data

XX Certification Organization
We requst for certification of Environmentally-friendly value of the following data.
Certification ID of the origin of environmentally-friendly value No. is granted to
Client ID:
Client name: X Co.
Address
POC (TEL, FAX, E-mail)
1) Object substance for environmental value certification (e.g. ethylene (plant-based))

1) Object substance for environmental value certification (e.g. ethylene (plant-based))
2) Certification items of environmentally-friendly value
-1 Origin of carbon contained in the object substance
(Is carbon contained in ethylene plant- or fossil-based?)
-2 Energy amount and energy source for production of the object substance
(e.g. Electric power: X kwh/kg ethylene (thermal power 90% and hydroelectric power 10%) Heavy oil: X l/kg ethylene
3) Quantity (e.g. ethylene 100 (kg))
4) Production history of the object substance
-1 Date of production
-2 Lot No. of products
-3 Name of factory and the address thereof
-4 Name of plant material
-5 Origin of plant material and the manufacturer thereof
-6 Production process (e.g. sugar → ethanol → ethylene)
-7 Amount and source of energy for production
5) Plan for use of the object substance
(e.g. used for production of PE, PS, PET)
6) Secondary user of the object substance
(e.g. X Plastic Industry Co., Y Plant)

Fig.44

Environmentally-friendly Value Certification Data

Environmentally-friendly value of the product produced by the following manufacturer is certified as below.
Client ID:
Client name: X Co.
Certification ID of the origin of environmentally-friendly value No.

1) Object substance for environmental value certification (e.g. ethylene (plant-based))
2) Certification items of environmentally-friendly value

-1 Carbon contained in the molecular structure of the object substance X is plant-based as shown in the following production history.
Amount of object substance (e.g. ethylene): X kg
-2 Energy amount for production
To substance for environmental value certification 1 kg:
Electric power: X kwh/kg ethylene (thermal power 90% and hydroelectric power 10%)
Heavy oil: X l/kg ethylene
Natural gas: X Nm3/kg ethylene
3) Production history of the object substance
-1 Date of production
-2 Lot No. of products
-3 Name of factory and the address thereof
-4 Name of plant material
-5 Origin of plant material and the manufacturer thereof
-6 Production process (e.g. sugar → ethanol → ethylene)
-7 Amount and source of energy for production
4) Usage for the object substance
(e.g., used for production of PE, PS, PET)
5) Secondary user of the object substance
(e.g. X Plastic Industry Co., Y Plant)

Certifier: Certification Organization (month) (date) (year)

(Digital signature)

Fig.45

Transfer Request Data Reference No. XXX

(Entry screen)
Client ID: XXX
Client name: XXX Co.
(1) Certification ID of the source of environmentally-friendly value No. XXX
(2) Name of the substance of transferor of an environmental value (e.g., ethylene)
(3) Environmental value requested to be transferred
-1 Source of carbon contained in the object substance
(plant-based: XX %; fossil-based: YY %)
(e.g. plant-based: 100 %; fossil-based: 0 %)
-2 Energy amount and energy source for production of the object substance
Amount of carbon in which fossil-based resource is used may be used as conversion.
(e.g., Electric power: X kwh/kg ethylene (90% of thermal power, and 10% of hydroelectric power)
Heavy oil: X l/kg ethylene
(4) Quantity: XX kg in object substance, subscription to sale of forward contracts possible other than spots
(e.g., ethylene 100 kg) (e.g., 1,000 kg by Y month of 20XX)
(5) Suggested transfer price: Unit price: X yen/ kg ethylene environmental value
* The entry screen changes according to the trading types, i.e., trades involving prices designated by buyers or sellers, auction, and reverse-auction.
* The transfer price is may be indicated, inclusive of the source of carbon contained in the product and the energy for production, or itemized

Fig.46

Method of computation of transfer index

(1)

The production volume of the first product is converted to the amount of plant-based carbon (X kg of the plant-based carbon) of the substance of transferor of an environmentally-friendly value (the first product).

(Example)

In case of ethylene, the amount of plant-based carbon is computed from the molecular weight by using the number of moles.

Ethylene: C_2H_4, the molecular weight: 28 and the number of moles: 24

Amount of ethylene: X kg ×24÷28= Y kg carbon (I)

The percentage of the plant-based carbon from the transfer request data of Fig. 45 is multiplied.

(I)× percentage of plant-based carbon: X % = Y kg carbon (II)

(2)

Conversion to a unit price: Conversion to a suggested price for transfer per unit weight of plant-based carbon (X yen/ plant-based carbon kg)

(Example)

Conversion to unit price of the plant-based carbon of the suggested price for transfer

Unit price: X yen/ kg ethylene environmental value ÷ (II)

(3)

Conversion of energy for production: Conversion to the energy for production per unit carbon is made.

(Example)

The energy for production of unit weight of the substance of transferor of an environmentally-friendly value is divided by the total amount of carbon.

Fig.47

Acceptance Request Data　Referece No. XXX
(Entry screen)
Client ID: XXX
Client name: XXX Co.
(1) Name of the object substance for acceptance of environmental value and history thereof
Name of substance: XXX (e.g., polystylene)
History
- Material name and basic unit
e.g., 0.3 kg of Naphtha-based ethylene and 0.8 kg of Naphtha-based benzene,
Amount of styrene-monomer: 1.1 kg
- Manufacturer of material, Manufacturing plant
- Energy for production
(2) Classification of swap or allotment of value: swap ◎, allotment ◎
In case of allotment, the data is necessary, which indicates the purchase of the source of substance for environmentally-friendly value as in a system in which substances with an actual of environmentally-friendly value are traded.
(3) Purpose for purchase of value
-1 For a grant of an environmentally-friendly value to a product ◎
-2 For speculation ◎
(4) Environmental value requested for acceptance
-1 Percentage of plant-based carbon: X% (e.g., 10%)
(X% of plant-based carbon of total number of molecular of carbon is required)
-2 Existence of request for swap or allotment of energy for production
(5) Quantity: X kg (e.g., in 100 kg of polystyrene)
Offer of subscription of sale of forward contracts other than spot may be permitted.
(6) Suggested price for acceptance: X yen/kg of Y% Z of organic compound
(e.g., X yen/kg of 10% of plant-based polystyrene)
* The entry screen changes according to the trading types, i.e., trades involving prices designated by buyers or sellers, auction, and reverse-auction

Fig.48

Method of computation of production volume for acceptance

(1)

The substance of transferee of an environmentally-friendly value (the second product) is converted to the amount of carbon requesting for an environmentally-friendly value (X kg of the plant-based carbon).

(Example)

To polystyrene: 100 kg, 10% of an environmentally-friendly value is required: Polystyrene is (C6H5-CH=CH2)n, total number of moles (104)n, and the number of moles of carbon: (12×8)n=(96)n; therefore, the unit weight of polystyrene X: 96÷104

Moreover, the 10% of carbon requires the environmentally-friendly value, therefore: 1 kgX96÷104X10%=0.923 kg C (III) Furthermore, in case of considering production loss, the conversion of basic unit is done.

(2)

Conversion to a unit price: Conversion to a unit price per unit of the acceptance of the environmentally-friendly value (X yen/ plant-based carbon kg)

(Example)

X yen/ kg 10% plant-based polystyrene ÷ (III)

(3)

Selection of the object substance of value swappable or value allottable and percentage of swap or allotment. (according to the conditions of trade)

(Example)

Assume that the object substance, to which an environmentally-friendly value is required to be allotted, is polystyrene. Since polystyrene is produced by deriving ethylene and benzene, if derivative is included in the conditions, ethylene, benzene, and polystyrene are selected as the object of acceptance of value, and they are used for data matching. In cases where polystyrene is produced from ethylene and benzene, and the percentage of carbon from ethylene is 25%; the substance of transferee of the environmentally-friendly value is matched with ethylene within the scope of 25% at maximum.

(4)

Conversion of energy for production: conversion to energy for production per unit carbon.

(Example)

The energy for production if unit weight of the substance of transferee of the environmentally-friendly value is divided by the total amount of carbon.

Fig.49

Entry screen (output screen) of transferable item information and transfer approval

Client ID: XXXXXX

Client name: X Co

verification	Certification of the source of the environmentally-friendly value	Substance for the environmentally-friendly value: Substance name	Spot / Future	Amount	Possible transferee	Possible sale price: Origin of carbon	Possible sale price: Energy	Energy amount after conversion	Substance of trading partner	Sales approval	Swap/ Allotment
XXXXX	XXXXXXX	ethylene	Spot	XXkg	A chemical	¥XX/kg	¥XX/kg	—	ethylene	Tranfer approval button	Allotment
XXXXX	XXXXXXX	ethylene	Spot	XXkg	B products	¥XX/kg	¥XX/kg	XXkgC/kg ethylene	polystyrene	Tranfer approval button	Swap
XXXXX	XXXXXXX	ethylene	Spot	XXkg	A chemical	¥XX/kg	¥XX/kg	—	polystyrene	Tranfer approval button	Allotment
XXXXX		ethylene	Forward subscription	XXkg	C motors	Variable price A/kg	¥XX/kg	XXkgC/kg ethylene	PET	Tranfer approval button	Swap
XXXXX	XXXXXXX	propylene	Spot	XXkg	B products	¥XX/kg	¥XX/kg	XXkgC/kg propylene	polypropylene	Tranfer approval button	Swap
XXXXX	XXXXXXX	propylene	Forward subscriptio	XXkg	A chemical	Variable price A/kg	¥XX/kg	XXkgC/kg propylene	propylene	Tranfer approval button	Swap
XXXXX	XXXXXXX	propylene	Spot	XXkg	C motors	¥XX/kg	¥XX/kg	XXkgC/kg propylene	polypropylene	Tranfer approval button	Swap

Fig.50

Entry screen (output screen) of transferable item information and transfer approval

Client ID: XXXXXX

Client name: X Co

verification No.	Certification of the source of the environmentally-friendly value	Substance for the environmentally-friendly value: Substance name	Spot / Forward	Amount	Possible transferee	Possible sale price: Origin of carbon	Possible sale price: Energy	Energy amount after conversion	Substance of trading partner	Sales approval	Swap/ Allotment
XXXXX	XXXXXXX	ethylene	Spot	XXkg	A chemical	¥XX/kg	¥XX/kg	XXkgC/kg ethylene10%	ethylene	Tranfer approval button	Allotment
XXXXX	XXXXXXX	polystyrene	Spot	XXkg	B products	¥XX/kg	¥XX/kg	XXkgC/kgpolystyrene20%	ethylene	Tranfer approval button	Allotment
XXXXX		propylene	Forward Subscription	XXkg	A chemical	¥XX/kg	¥XX/kg	XXkgC/kg propylene10%	propylene	Tranfer approval button	Swap

Means for comparison

Flow of the means for comparison

1) The transfer request data and the acceptance request data, which correspond to the value exchange trading or the value assignment trading, are matched based on the data of 4 the means for computing the corresponding production volume of transfer and 6 the means for computing the corresponding production volume of acceptance.

2) According to the data matched, conversion is executed on the data, which is outputted to 7 Entry screen (output screen) for the transferable item information and the transfer approval and 8 Entry screen (output screen) for the acceptable item information and the acceptance approval. After that, the data is transmitted to the means for outputting information.

Fig.51

Acceptance of Environmentally-friendly Value and Certification of product

Client ID:

Client name: A Co.

It is certified that A Co. accepts the environmentally-friendly value created by B Co. using the following processes and that the product possesses the following environmental value:

1) Certification ID of the provider of environmentally-friendly value No.

2) Transaction ID No. ○○○ is granted

3) Name of product: X resin

4) Production volume: X kg

-1 Percentage of carbon derived from plants in relation to the total amount of carbon contained in the product: X %

-2 Energy for production (converted to carbon: X kg C)

The basis for the above computation will be described. If the certification number of the third party for energy for production of the fossil-based organic compound is provided, it will be described as well.

5) History of Environmentally-friendly value

-1 Name of substance for environmental value certification (e.g. ethylene (plant-based))

-2 Source of the environmentally-friendly value

-3 Carbon contained in the molecular structure of the object substance (ethylene) is plant-based as shown in the following production history.

Amount of the substance for environmental certification (e.g. ethylene): X kg and converted to carbon: X kg

-3 Energy amount for production

To substance for environmental value certification 1 kg:

Electric power kwh/kg ethylene (thermal power 90% and hydroelectric power 10%)

Heavy oil l/kg ethylene

Natural gas Nm3/kg ethylene

-4 Production history of the object substance

-1 Date of production

-2 Lot No. of products

-3 Name of factory and the address thereof

-4 Name of plant material

-5 Origin of plant material and the manufacturer thereof

-6 Production process (e.g. sugar → ethanol → ethylene)

-7 Amount and source of energy for production

-8 Secondary product of the substance providing environmental value (e.g., used for production of PE, PS, PET)

-9 Secondary user of the substance providing environmental value (e.g. X Plastic Industry Co., Y Plant)

Fig.52

Acceptance of Environmentally-friendly Value and Certification of transferability

Client ID:

Client name: A Co.

It is certified that A Co. accepts the environmentally-friendly value created by B Co. using the following processes and that the product possesses the following transferable environmental value

1) Certification ID of the provider of environmentally-friendly value No.

2) Transferable transaction ID No. is granted

3) Name of product: X resin

4) Production volume: X kg

-1 Percentage of carbon derived from plants in relation to the total amount of carbon contained in the product: X %

-2 Energy for production (converted to carbon: X kg C)

The basis for the above computation will be described. If the certification number of the third party for energy for production of the fossil-based organic compound is provided, it will be described as well.

5) History of Environmentally-friendly value

-1 Name of substance for environmental value certification (e.g. ethylene (plant-based))

-2 Source of the environmentally-friendly value

-3 Carbon contained in the molecular structure of the object substance (ethylene) is plant-based as shown in the following production history.

Amount of the substance for environmental certification (e.g. ethylene): X kg and converted to carbon: X kg

-3 Energy amount for production

To substance for environmental value certification 1 kg:

Electric power kwh/kg ethylene (thermal power 90% and hydroelectric power 10%)

Heavy oil l/kg ethylene

Natural gas Nm3/kg ethylene

-4 Production history of the object substance

-1 Date of production

-2 Lot No. of products

-3 Name of factory and the address thereof

-4 Name of plant material

-5 Origin of plant material and the manufacturer thereof

-6 Production process (e.g. sugar → ethanol → ethylene)

-7 Amount and source of energy for production

-8 Secondary product of the substance providing environmental value (e.g., used for production of PE, PS, PET)

-9 Secondary user of the substance providing environmental value (e.g. X Plastic Industry Co., Y Plant)

Fig.53

Request Data for Certification of Product with Environmentally-friendly Value
(Entry screen)
Client ID:
Client name: X Co.

We request for certification of the environmental value of the organic compound A used in B product produced by us.

1) Certification ID of the source of environmentally-friendly value No.
2) Transaction ID (direct value trader) No.
3) Specification of the product for request of certification
-1 Organic compound in product
-2 Amount: X kg
-3 Object for use: A parts of B product
-4 Production Lot No. of A parts
-5 Production Date

Fig.54

Certification of Environmentally-friendly Value Product

Client ID:

Client name: X Co.

It is certified that A parts produced by X Co. possesses the environmentally-friendly value created by B Co. using the following processes:

1) Certification history

-1 Certification ID of the source of environmentally-friendly value No.

-2 Transaction ID (direct value trader) No.

-3 Certification ID of product No. is granted.

2) Object product: X cleaner, Y chassis: X kg

3) Name of product: X resin

4) Plant-based carbon percentage: X %

5) Energy for production (converted to carbon: X kgC/ PS 10%)

6) Source of the environmentally-friendly value

-1 Carbon contained in the molecular structure of the object substance (ethylene) is plant-based as shown in the following production history.

Amount of the substance for environmental certification (e.g. ethylene): X kg and converted to carbon: X kg-2 Energy amount for production

To substance for environmental value certification 1 kg:

Electric power kwh/kg ethylene (thermal power 90% and hydroelectric power 10%)

Heavy oil l/kg ethylene

Natural gas Nm3/kg ethylene

-2 Energy amount for production

To substance for environmental value certification 1 kg:

Electric power kwh/kg ethylene (thermal power 90% and hydroelectric power 10%)

Heavy oil l/kg ethylene

Natural gas Nm3/kg ethylene

7) Production history of the object substance

-1 Date of production

-2 Lot No. of products

-3 Name of factory and the address thereof

-4 Name of plant material

-5 Origin of plant material and the manufacturer thereof

-6 Production process (e.g. sugar → ethanol → ethylene)

-8 Secondary product of the substance providing environmental value
(e.g., used for production of PE, PS, PET)

-9 Secondary user of the substance providing environmental value
(e.g. X Plastic Industry Co., Y Plant)

-7 Amount of energy for production

-8 Secondary product of the substance providing environmental value
(e.g., used for production of PE, PS, PET)

-9 Secondary user of the substance providing environmental value
(e.g. X Plastic Industry Co., Y Plant)
(e.g. X Plastic Industry Co., Y Plant)

Fig.55

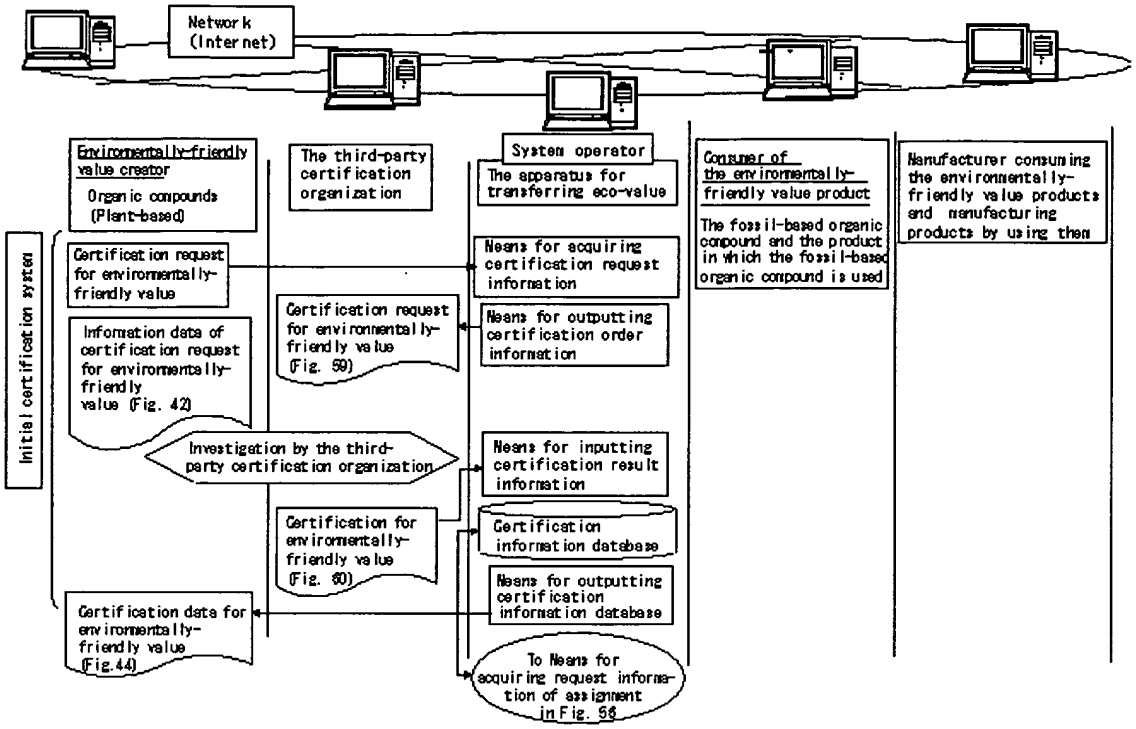

Network (Internet)
Environmentally-friendly value creator
Organic compounds (Plant-based)
The third-party certification organization
System operator
The apparatus for transferring eco-value
Consumer of the environmentally-friendly value product
The fossil-based organic compound and the product in which the fossil-based organic compound is used
Manufacturer consuming the environmentally-friendly value products and manufacturing products by using them
Initial certification system
Certification request for environmentally-friendly value
Means for acquiring certification request information
Certification request for environmentally-friendly value (Fig. 59)
Means for outputting certification order information
Information data of certification request for environmentally-friendly value (Fig. 42)
Investigation by the third-party certification organization
Means for inputting certification result information
Certification for environmentally-friendly value (Fig. 60)
Certification information database
Means for outputting certification information database
Certification data for environmentally-friendly value (Fig.44)
To Means for acquiring request information of assignment in Fig. 56

Fig.56

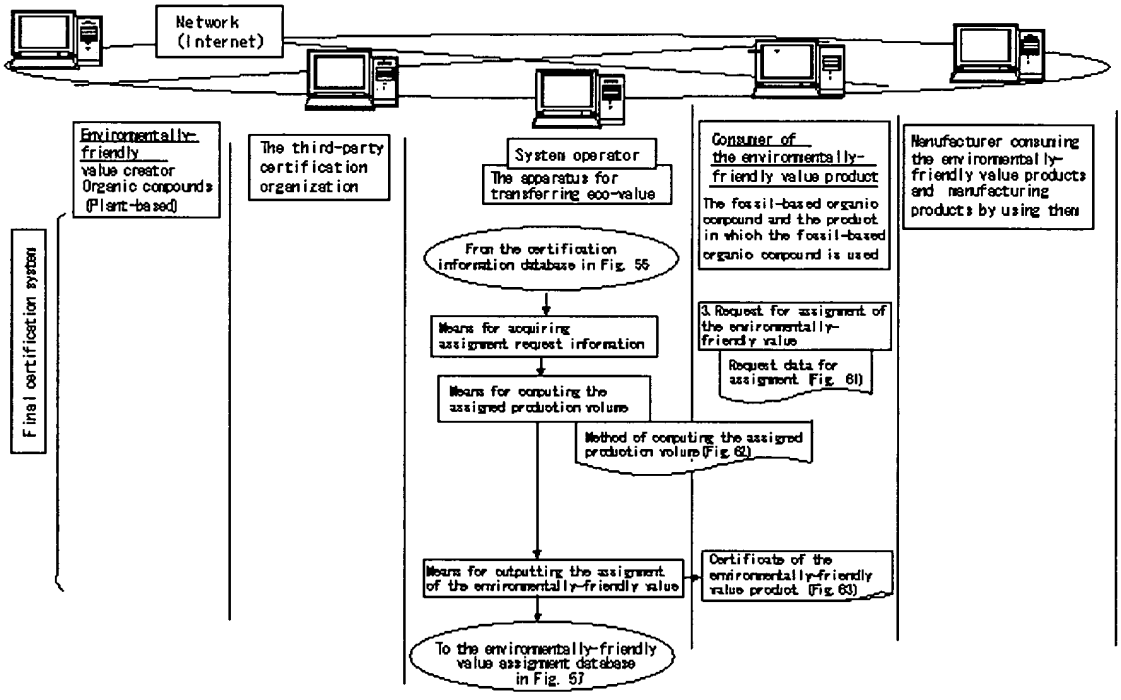

Network (Internet)
Environmentally-friendly value creator Organic compounds (Plant-based)
The third-party certification organization
System operator
The apparatus for transferring eco-value
Consumer of the environmentally-friendly value product
The fossil-based organic compound and the product in which the fossil-based organic compound is used
Manufacturer consuming the environmentally-friendly value products and manufacturing products by using them
Final certification system
From the certification information database in Fig. 55
Means for acquiring assignment request information
3. Request for assignment of the environmentally-friendly value
Request data for assignment (Fig. 61)
Means for computing the assigned production volume
Method of computing the assigned production volume (Fig. 62)
Means for outputting the assignment of the environmentally-friendly value
Certificate of the environmentally-friendly value product (Fig. 63)
To the environmentally-friendly value assignment database in Fig. 57

Fig.57

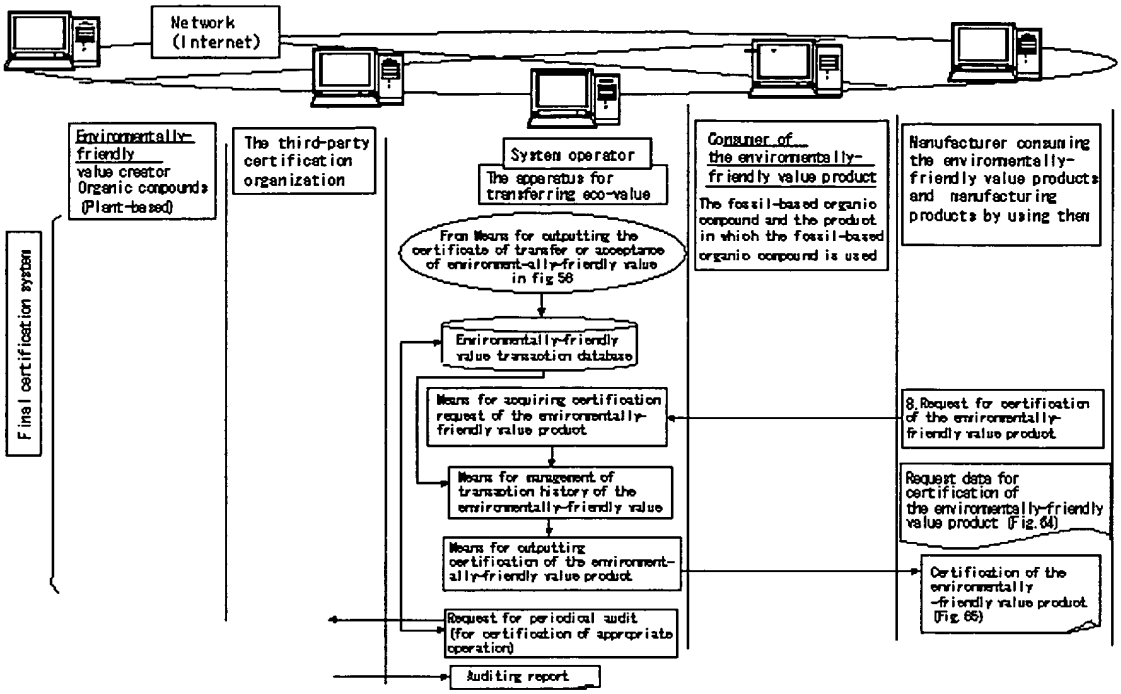

Network
(Internet)
Environmentally-friendly value creator Organic compounds (Plant-based)
The third-party certification organization
System operator
The apparatus for transferring eco-value
Consumer of the environmentally-friendly value product
The fossil-based organic compound and the product in which the fossil-based organic compound is used
Manufacturer consuming the environmentally-friendly value products and manufacturing products by using them
Final certification system
From Means for outputting the certificate of transfer or acceptance of environment-ally-friendly value in fig 56
Environmentally-friendly value transaction database
Means for acquiring certification request of the environmentally-friendly value product
8.Request for certification of the environmentally-friendly value product
Means for management of transaction history of the environmentally-friendly value
Request data for certification of the environmentally-friendly value product (Fig.64)
Means for outputting certification of the environment-ally-friendly value product
Certification of the environmentally-friendly value product (Fig.65)
Request for periodical audit (for certification of appropriate operation)
Auditing report

Fig.58

Environmentally-friendly Value Certification Request Information Data

(Entry screen)

Client ID: XXXXXX

Client name : XX Co.

We request for acquisition of an environmentally-friendly value certification by a third party with respect to the following items:

1) Substance for environmental value certification (e.g. ethylene (plant-based))
2) Certification items of environmentally-friendly value
 -1 Origin of carbon contained in the object substance
 (Is carbon contained in ethylene plant- or fossil-based?)
 -2 Energy amount and energy source for production of the object substance
 (e.g. Electric power: X kwh/kg ethylene (thermal power 90% and hydroelectric power 10%) Heavy oil: X l/kg ethylene
3) Quantity (e.g. ethylene 100 (kg))
4) Production history of the object substance
 -1 Date of production
 -2 Lot No. of products
 -3 Name of factory and the address thereof
 -4 Name of plant material
 -5 Origin of plant material and the manufacturer thereof
 -6 Production process (e.g. sugar → ethanol → ethylene)
 -7 Amount and source of energy for production
5) Usage for the object substance
 (e.g., used for production of PE, PS, PET)
6) Secondary user of the object substance
 (e.g. X Plastic Industry Co., Y Plant)

Fig.59

Certification ID of the provider of environmentally-friendly value No. is granted to

XX Certification Organization
We requst for certification of Environmentally-friendly value of the following data.
Certification ID of the origin of environmentally-friendly value No. is granted to
Client ID:
Client name: X Co.
Address
POC (TEL, FAX, E-mail)

1) Substance for environmental value certification (e.g. ethylene (plant-based))
2) Certification items of environmentally-friendly value
-1 Origin of carbon contained in the object substance
(Is carbon contained in ethylene plant- or fossil-based?)
-2 Energy amount and energy source for production of the object substance
(e.g. Electric power: X kwh/kg ethylene (thermal power 90% and hydroelectric power 10%) Heavy oil: X l/kg ethylene
3) Quantity (e.g. ethylene 100 (kg))
4) Production history of the object substance
-1 Date of production
-2 Lot No. of products
-3 Name of factory and the address thereof
-4 Name of plant material
-5 Origin of plant material and the manufacturer thereof
-6 Production process (e.g. sugar → ethanol → ethylene)
-7 Amount and source of energy for production
5) Plan for use of the object substance
(e.g. used for production of PE, PS, PET)
6) Secondary user of the object substance
(e.g. X Plastic Industry Co., Y Plant)

Fig.60

Certification ID of the provider of environmentally-friendly value No. is granted to

Environmentally-friendly value of the product produced by the following manufacturer is certified as below.
Client ID:
Client name: X Co.
Certification ID of the origin of environmentally-friendly value No.

1) Object substance for environmental value certification (e.g. ethylene (plant-based))
2) Certification items of environmentally-friendly value

-1 Carbon contained in the molecular structure of the object substance X is plant-based as shown in the following production history.
Amount of object substance (e.g. ethylene): X kg
-2 Energy amount for production
To substance for environmental value certification 1 kg:
Electric power: X kwh/kg ethylene (thermal power 90% and hydroelectric power 10%)
Heavy oil: X l/kg ethylene
Natural gas: X Nm3/kg ethylene
3) Production history of the object substance
-1 Date of production
-2 Lot No. of products
-3 Name of factory and the address thereof
-4 Name of plant material
-5 Origin of plant material and the manufacturer thereof
-6 Production process (e.g. sugar → ethanol → ethylene)
-7 Amount and source of energy for production
4) Usage for the object substance
(e.g., used for production of PE, PS, PET)
5) Secondary user of the object substance
(e.g. X Plastic Industry Co., Y Plant)

Certifier: Certification Organization (month) (date) (year)

(Digital signature)

Fig.61

Environmentally-friendly Value Allotment Request Data
(Entry screen)
Client ID: XXX
Client name: XXX Co.
(1) Certification ID of the source of environmentally-friendly value No. XXX
(2) Name of the substance for certification of an environmental value (e.g., ethylene)
(3) Environmental value requested to be allotted
-1 Source of carbon contained in ethylene
(plant-based or fossil-based and percentage thereof)
(e.g. plant-based: 100 %; fossil-based: 0 %)
-2 Energy amount and energy source for production of the object substance
(e.g., Electric power: X kwh/kg ethylene (90% of thermal power, and 10% of hydroelectric power)
Heavy oil: X l/kg ethylene)
-3 Amount of energy for production of fossil-based ethylene
If there is the certification ID of the third-party certification organization, it will be indicated: XXX
(4) Allotment request Polyethylene: 20% of plant-based: 5,000 kg
(5) Basic unit necessary for substantial chemical conversion from the substance, which is the source of environmentally-friendly value, to organic compound, which is requested to be allotted.
[Substantial amount of an environmentally-friendly value substance, which is necessary for producing derivative for allotment request per unit weight, and other necessary substances and amount thereof; in cases where the derivative of amount for allotment request is produced from the environmentally-friendly value substance]
(e.g., only 1.1 kg of ethylene is necessary for producing 1 kg of polyethylene)

Fig.62

Method of computation of corresponding production volume for allotment

1. Computation of allotment of necessary volume of a substance with an environmentally-friendly value

(Example of computation of allotment)

The production volume of the organic compound of the originator of the environmentally-friendly value, which has been certificated, is computed based on the allotment request data of Fig. 61.

(Example)

Assume that the substance with an environmentally-friendly value is 2.000 kg of ethylene, and is allotted to 5,000 kg of polyethylene: plant-based 20%. In cases where the definition of percentage of plan-based is that percentage of the number of moles of plant-based carbon of total the number of moles of carbon contained in the object substance of computation of percentage of plan-based is greening percentage; the production volume of the organic compound of the originator of the environmentally-friendly value is converted to amount of carbon contained in the amount of substance providing an environmentally-friendly value, after that, conversion is done by the basic unit suggested in Fig. 61.

The number of moles of the carbon from ethylene of the number of moles (28)n of polyethylene $(C_2H_4)n$ is $(12\times2)n=(24)n$. In theory the number of moles of carbon of the total number of moles (24)n ÷ the number of moles of carbon from ethylene (24)n = 1. Therefore, in cases where 20% of carbon per unit weight of polyethylene is set to plant-based carbon, it follows ratio 1×20%. From the data of Fig. 61, in cases where 1.1 kg of ethylene to 1 kg of polyethylene; 1.1 kg × 20% of ethylene is plant-based, substantially. Therefore, 20% plant-based carbon of 5,000 kg of ethylene is: 5,000 kg × 20% × 1.1 kg = 1,100 kg. To 2,000 kg of ethylene with an environmentally-friendly value, 1,100 kg of the plant-based ethylene is allotted.

2. Computation of energy of organic compound, to which an environmentally-friendly value is allotted

The energy of organic compound, to which an environmentally-friendly value is allotted, is computed by amount of energy for production of organic compound with an environmentally-friendly value to the above necessary amount of ethylene + remaining amount of energy to a necessary amount of fossil-based organic compound.

Fig.63

Certification of Environmentally-friendly Value Product
(Entry screen)
Client ID:
Client name: X Co.
It is certified that the environmentally-friendly value created by B Co. using the following processes is assigned to the product of A Co.

1) Certification ID of the provider of environmentally-friendly value No.
2) Transaction ID No. ○○○ is granted
3) Name of product: X resin
4) Production volume: X kg
-1 Percentage of carbon derived from plants in relation to the total amount of carbon contained in the product: X %
-2 Energy for production (converted to carbon: X kg C)
The basis for the above computation will be described. If the certification number of the third party for energy
for production of the fossil-based organic compound is provided, it will be described as well.
5) History of Environmentally-friendly value
-1 Name of substance for environmental value certification (e.g. ethylene (plant-based))
-2 Source of the environmentally-friendly value
-3 Carbon contained in the molecular structure of the object substance (ethylene) is plant-based as shown in the following production history.
Amount of the substance for environmental certification (e.g. ethylene): X kg and converted to carbon: X kg
-3 Energy amount for production
To substance for environmental value certification 1 kg:
Electric power kwh/kg ethylene (thermal power 90% and hydroelectric power 10%)
Heavy oil l/kg ethylene
Natural gas Nm3/kg ethylene
-4 Production history of the object substance
-1 Date of production
-2 Lot No. of products
-3 Name of factory and the address thereof
-4 Name of plant material
-5 Origin of plant material and the manufacturer thereof
-6 Production process (e.g. sugar → ethanol → ethylene)
-7 Amount and source of energy for production

Fig.64

Request Data for Certification of Product with Environmentally-friendly Value
(Entry screen)
Client ID:
Client name: X Co.
We request for certification of the environmental value of the organic compound A used in B product produced by us.

1) Certification ID of the source of environmentally-friendly value No.
2) Assignment ID No.
3) Specification of the product for request of certification
-1 Organic compound in product
-2 Amount: X kg
-3 Object for use: A parts of B product
-4 Production Lot No. of A parts
-5 Production Date

Fig.65

Certification of Environmentally-friendly Value Product
Client ID:
Client name: X Co.

It is certified that A parts produced by X Co. possesses the environmentally-friendly value created by B Co. using the following processes:
1) Certification history
-1 Certification ID of the provider of environmentally-friendly value No.
-2 Transaction ID of the direct value trader No. is granted.
-3 Certification ID of the present product No. is granted.
2) Object product: X cleaner, Y chassis: X kg
3) Name of product: X resin
4) Plant-based carbon percentage: X %
5) Energy for production (converted to carbon: X kgC/ PS 10%)
6) Source of the environmentally-friendly value
-1 Carbon contained in the molecular structure of the object substance (ethylene) is plant-based as shown in the following production history.
Amount of the substance for environmental certification (e.g. ethylene): X kg and converted to carbon: X kg
-2 Energy amount for production
To substance for environmental value certification 1 kg:
Electric power kwh/kg ethylene (thermal power 90% and hydroelectric power 10%)
Heavy oil l/kg ethylene
Natural gas Nm3/kg ethylene
7) Production history of the object substance
-1 Date of production
-2 Lot No. of products
-3 Name of factory and the address thereof
-4 Name of plant material
-5 Origin of plant material and the manufacturer thereof
-6 Production process (e.g. sugar → ethanol → ethylene)
-8 Secondary product of the substance providing environmental value
(e.g., used for production of PE, PS, PET)
-9 Secondary user of the substance providing environmental value
(e.g. X Plastic Industry Co., Y Plant)
-7 Amount of energy for production

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